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ARTERIAL HYPERTENSION

CHAIRMAN'S ADDRESS

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Four years ago I presented a paper[1] before this section entitled "Hypertension a Century After Bright" in which the etiology and pathogenesis of clinical hypertension and, more specifically, so-called essential hypertension were considered in the light of recent experimental studies of Goldblatt and his associates. After surveying the evidence, both experimental and clinical, I advanced the following hypothesis concerning the interrelation between arteriosclerosis, hypertension and kidney disease:

> Arterial and arteriolar sclerosis of the kidney vessels excite a renal humoral mechanism which produces an increased muscular tone in the peripheral arterioles and thus causes elevation in the systemic blood pressure.

This explanation of that most common type of protracted elevation in blood pressure, hitherto called primary or essential hypertension, was regarded by many as a bold step. Now, after four years, the position has suffered no major attacks; indeed, it appears better fortified by more recent experimental and clinical observations. However, there are still a few men in positions of authority who would keep the etiology of essential hypertension surrounded by obscurity and have us cling to the notion that the kidneys play no role in the genesis of this type of hypertension.

As there are few questions of more importance to the practitioner than hypertension, I will devote my chairman's address to the thesis that arterial hypertension, and especially so-called essential hypertension, is of renal origin.

Obviously eliminated from this discussion is the occasional clinical case of arterial hypertension due to such endocrine disorders as dysfunction and tumors of the pituitary and adrenals, and to disorders of the nervous system such as tumors and psychogenic disturbances. That the endocrine glands may play a role in some clinical cases of essential hypertension is established, but it should be noted that the majority of hypertensive patients show neither clinical nor postmortem evidence of disease of the endocrine organs.[2] Because psychogenic factors often cause wide variations in blood pressure levels, it is assumed by some that the nervous system plays a major role in the pathogenesis of essential hypertension, but there is no evidence that disease of either the central nervous system or the vegetative nervous system is the cause of essential hypertension.

We are not concerned here with those cases of systolic hypertension usually found in elderly persons whose blood pressure may be persistently well above normal but who do not have a corresponding elevation in diastolic pressure. Such patients often survive to a ripe old age and post mortem exhibit widespread arteriosclerosis of the aorta and other large arteries.

In the consideration of a question about which opinions differ, it is often profitable to launch the discussion by reviewing such evidence as is accepted to be factual. For example, a hypertrophied heart without intrinsic heart disease is accepted as a reliable postmortem evidence that, during life, arterial hypertension was present. Let us therefore examine carefully a large series of such heavy hearts. We shall find a few cases of cor pulmonale, a few cases of long-standing coronary arteriosclerosis, and an occasional example of such rare disorders as either Fiedler's myocarditis or idiopathic cardiac hypertrophy. Eliminating these, we have an overwhelming percentage of our original cases in which a careful examination of the heart reveals no cause for the hypertrophy. But let us have a look at the kidneys! The correlation between cardiac hypertrophy and diseased kidneys is as striking today as it was in Bright's day, indeed more so, since our improved technical methods supply information, particularly regarding the intimate vasculature of the kidneys, that was not available to Bright.

The correlation between diseased kidneys and cardiac hypertrophy without intrinsic heart disease led Bright more than a century ago to postulate the renal origin of hypertension. This conception was accepted and widely held until 1872, when Gull and Sutton, impressed by the diffuse nature of vascular sclerosis, which they called "arterio-capillary fibrosis," assumed that "these changes are, or may be, independent of renal disease, and that the renal changes in chronic Bright's disease with contracted kidneys, when present, are but a part of the morbid condition."

Attention was thus forcused on diffuse vascular disease as a primary pathologic entitity while the renal vascular changes were regarded as secondary. The conclusions of Gull and Sutton were generally accepted,

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1. Scott, R. W.: Hypertension a Century After Bright, J. A. M. A. **111**: 2460 (Dec. 31) 1938. Only those references not contained in the paper cited are cited in the present address.

2. Heretofore the kidney has not been regarded as an endocrine organ, but its role as such is indicated by the recent observations in experimental hypertension.

and as a result there began a swing of the pendulum away from Bright's view regarding the renal origin of hypertension. As observations on patients with hypertension rarely showed impairment of renal function, there emerged about the turn of the century the modern concept of so-called essential hypertension, which has widened the breach still further—so far, indeed, that the kidney was thought to play no role whatever in this type of hypertension.

Now, with the proof afforded by Goldblatt, and many others who have confirmed his results, the renal origin of hypertension is firmly established and Bright after a hundred years stands vindicated.

Time does not permit a survey of the experimental work which entirely supports the modern conception that persistent arterial hypertension is due to the resistance imposed by widespread hypertonicity of the peripheral arterioles. That this peripheral hypertonus in man is not vasomotor in origin has been shown by the work of Printzmetal and Wilson and by Pickering, whereas all observations bearing on the pathogenesis of experimental hypertension indicate that it is not of reflex but of humoral origin.

We may now return to our human material exhibiting cardiac hypertrophy. Let us consider first those showing obvious renal disease, because here is evidence for the existence of renal hypertension which even our most ardent opponents must and do accept. We shall see examples of chronic glomerulonephritis, polycystic disease, chronic pyelonephritis, severe amyloidosis, periarteritis nodosa of the renal vessels, congenital hypoplasia of one or both kidneys and an occasional case of adenomyosarcoma (Wilms's tumor) of the kidney. We shall also see examples of hypertension associated with obstruction of the urinary passages, such as hydronephrosis, prostatic enlargement and carcinoma of the uterus with ureteral obstruction. In addition to the foregoing evidence supporting the existence of purely renal hypertension, I may cite as further evidence the well known clinical observations of a prompt elevation of the blood pressure observed in a young patient with acute nephritis and in patients with embolism of the renal artery.

Since the work of Goldblatt shows that hypertension may result from constriction of the main renal artery, we shall look for and find a number of cases in which arteriosclerosis has narrowed one or both renal arteries. I saw a patient recently who several days before death developed a severe and unexplained hypertension. A postmortem examination revealed an ascending thrombosis of the aorta which had blocked both renal arteries.

The most striking example of all, proving the direct relation between the kidney and hypertension, is the fall of blood pressure following nephrectomy in a patient with unilateral renal disease.

In the face of such evidence it is clear that diseased kidneys exercise a direct control over the tonicity of the peripheral arterioles, which in turn regulates the systemic blood pressure.

"Very well," say the opponents, "we agree that hypertension accompanying obvious kidney disease is due to a renal mechanism, but what about those cases of protracted hypertension that neither have, nor develop, clinical evidence of renal disease." Here we may pause to review briefly the origin of the modern concept of so-called essential hypertension.

After the sphygomanometer came into general use about 1900 and clinical measurements of blood pressure accumulated, the clinicians of the time sought a correlation between hypertension and clinical evidence of sclerotic changes in the arteries. Failing to find such a correlation, some assumed with von Bosch and with Huchard that the elevated blood pressure was a precursor of vascular disease. Others, notably Allbutt, believed that organic changes in the arterioles were not sufficiently widespread to cause persistent hypertension, which was thought to be due to a generalized vasoconstriction. Thus Allbutt explained the pathogenesis of hypertension but not the etiology. In other words, he did not determine the cause of generalized vasoconstriction, but the kidney was not seriously considered as playing a major role in the production of this type of hypertension.

A survey of the literature in the decade following 1900 reveals a widespread interest in the interrelation of hypertension, arteriosclerosis and renal disease, which culminated in four points of view. They were that: 1. Kidney disease was primary and caused both hypertension and arteriosclerosis. 2. Diffuse vascular disease was the cause of hypertension and the kidney played no role in the genesis of either hypertension or arteriosclerosis. Such renal vascular lesions as might occur were regarded as incidental and but a part of generalized vascular disease. 3. Hypertension was the cause of arteriosclerosis; as Huchard wrote, "Hypertension precedes by a longer or shorter time the evolution of the various diseases (arterial cardiopathies and nephritides) which are in themselves dependent on the vascular sclerosis." 4. Hypertension resulted from a generalized vasoconstriction of unknown origin but unrelated to either kidney disease or to vascular disease.

Conflicting as these views may now seem, it should be recalled that they were based on an incomplete knowledge of kidney disease, and it was not until 1904 that Jores and others recognized two types of scarred kidneys, the inflammatory and the arteriosclerotic, both of which had been confused since Bright. A great advance in the field was made in 1914, when Volhard and Fahr published their observations on the renal vascular lesions in hypertension. They showed that the kidneys of patients with essential hypertension exhibited more or less diffuse sclerosis of the smaller renal arteries and introduced the term "nephrosclerosis" to describe this condition. Although pathologists had no difficulty in verifying the observations of Volhard and Fahr, most clinicians, impressed by the great frequency of hypertension without clinically significant renal disease, assumed that the kidney played no role in this type of hypertension.

Thus there emerged the concept of primary or essential hypertension—a term which implies an obscure etiology of the hypertension and separates it from renal hypertension. In other words, the term essential hypertension really means nonrenal hypertension of undetermined origin. From the German essentielle hypertonie, first used by Frank, came the term essential hypertension, which has been used in this country for more than twenty years.

If, as some assume, the kidneys are not concerned in the pathogenesis of so-called essential hypertension, then it seems reasonable to suppose that the majority of cases would show no significant renal disease. But, as is well known, they do show renal disease. Indeed, there are seasoned clinicians and pathologists who claim never to have seen a case of prolonged hypertension in which a careful postmortem examination did not reveal dis-

eased kidneys. In 1928 Bell and Clawson, in a careful study of 420 cases of essential hypertension, found renal arterial disease within the parenchyma of the kidney in 97.4 per cent and sclerosis of the afferent glomerular arterioles in 89.4 per cent. Fishberg reported renal arteriolar sclerosis in 100 per cent of a series of 72 cases of essential hypertension.

More recently Moritz and Oldt, in a purely objective study of the arterioles from many parts of the body of 100 persons with and 100 persons without hypertension, found a high correlation between arteriolar disease and hypertension in one situation only, the kidneys. In view of such evidence the question naturally arises Why has the renal origin of essential hypertension been questioned, and on what grounds were the kidneys removed from consideration?

The chief arguments were as follows: 1. Protracted hypertension may exist without demonstrable impairment of renal excretory function. 2. The great majority of patients with essential hypertension never develop renal insufficiency but die of heart failure or a cerebral vascular accident. 3. Occasionally a patient with well defined hypertension is reported as showing no anatomic evidence of renal arteriolar disease.

The fact that protracted hypertension occurs without demonstrable renal excretory insufficiency afforded the major support for the concept of essential or nonrenal hypertension. Now that the experiments of Goldblatt and others have demonstrated the role of the kidney in producing hypertension, that pronounced and persistent elevations in blood pressure may be produced in animals which exhibit no demonstrable evidence of renal excretory insufficiency, those who still adhere to the nonrenal conception of hypertension are deprived of their most cherished argument. The hypertensive animal with the main renal arteries constricted, but without manifest renal excretory functional disease, is, as far as concerns the phenomenon of hypertension, the experimental counterpart of benign essential hypertension observed in man. Even the clinical picture of malignant hypertension has been produced in the hypertensive animal by further narrowing of the renal arteries. Such animals exhibit the changes observed in human malignant hypertension, i. e. papilledema, retinitis and protein retention with uremic death, and at postmortem show the same type of arteriolar necrosis as that seen in man.[3]

Thus, by interference with the blood supply to the kidney, the phenomenon of hypertension is reproduced in animals. Here is the solution of a problem which has puzzled clinicians for decades; namely, hypertension clearly of renal origin both with and without demonstrable renal excretory insufficiency. Those who believe that these animal observations do not apply to man must explain the close parallelism between experimental and clinical hypertension, both benign and malignant. As far as a functional disturbance is concerned—and certainly hypertension is a manifestation of an altered function—there is no more striking similarity than that of experimental renal hypertension to clinical hypertension. Rarely has the animal experimenter so faithfully reproduced a protracted alteration of function such as occurs in human hypertension.

3. Arteriolar necrosis is not observed in the kidneys of animals with clamped renal arteries. This suggests that an increased intravascular pressure is an important factor in the production of arteriolar necrosis.

One other argument presented in defense of the nonrenal genesis of essential hypertension is that occasionally hypertensive patients are reported as showing post mortem no renal arteriolar sclerosis. This observation carried more weight formerly than now, because prior to Goldblatt neither clinicians nor pathologists were aware of the fact that sclerotic narrowing of the main renal arteries caused hypertension. All such cases were probably overlooked and classified as instances of essential hypertension without renal arteriolar disease.

How frequently one finds significant sclerosis of the main renal arteries is shown by the recent observations of Blackman.[4] In a series of 50 cases of essential hypertension, he found pronounced stenosis of one or both renal arteries in 27, or 54 per cent. Therefore, unless the main renal artery is examined, as well as its branches within the kidney, the failure to find arteriolar lesions cannot be accepted as evidence against the renal origin of hypertension. In any attempt to associate hypertension with renal arteriolar disease, we should bear in mind that we are correlating an alteration of function with one of structure and that in such an equation there are unknowns, an important one of which is the quantitative relation between renal lesions and hypertension. In other words, we do not know how widespread the renal vascular lesions must become in order to excite the mechanism responsible for hypertension. This mechanism is induced in animals by narrowing one renal artery; it operates in human beings with unilateral renal disease and ceases, as is now well established, on the removal of the diseased kidney. These facts indicate that a reduction of the blood flow to one half of the total kidney mass is sufficient to elevate the blood pressure, but beyond that we have no knowledge of the quantitative relation that may exist between kidney disease and hypertension.

The most impressive work on the incidence of renal arteriolar disease observed post mortem in patients with essential hypertension is that recently published by Bell,[5] who studied 1,520 cases. Although his findings afford a strong link in the chain of evidence supporting my thesis, Bell has interpreted his data in the opposite way. I am constrained therefore to mention certain obvious limitations imposed by the nature of his observations on the relation of renal arteriosclerosis to hypertension.

Those who are familiar with his work on the subject know that his use of the term "arteriole" refers to an afferent glomerular arteriole which supplies only one glomerulus. Since there are about 1,250,000 afferent glomerular arterioles in each kidney, the pathologist who examines one or two routine sections will see at most 10 preglomerular arterioles, or 1 in 125,000. If he was to examine one hundred sections he might then observe 1 in 12,500 preglomerular arterioles. Obviously, then, success in finding renal arteriolar lesions after examining a few sections of the kidney means, in reality, that virtually all the arterioles are involved, whereas a failure to find them in even one hundred sections cannot be accepted as proof that no such lesions exist.

I recently saw a patient with chronic hypertension who died of congestive heart failure. The postmortem

4. Blackman, S. S., Jr.: Arteriosclerosis and Partial Obstruction of Main Renal Arteries in Association with "Essential" Hypertension in Man, Bull. Johns Hopkins Hosp. **65**: 353-375 (Nov.) 1939.

5. Bell, E. T.: Primary Hypertension: Clinical and Pathological Study of 1,520 Cases With Especial Reference to Renal Arteriosclerosis, Proc. A. Life Insur. M. Dir. America (1939) **26**: 269-298, 1940.

weight of the heart was 600 Gm., and it exhibited no evidence of intrinsic heart disease. As happens in some such cases, the kidneys were not remarkable grossly. Together they weighed 400 Gm., and the surfaces of both were smooth. From an examination of a single routine section of each kidney, our pathologist reported no renal arteriolosclerosis and demonstrated the case as an example of essential hypertension without renal vascular disease. This negative finding was a challenge. The sections were carefully restudied and the sparsity of preglomerular arterioles was noted. After a thorough search only 2 seriously affected afferent glomerular arterioles were found. Then about one hundred sections of each kidney were examined and the existence of a widespread preglomerular arteriolar disease was established.

Turning now to Bell's paper, we find in a series of 1,520 cases 246 of hypertension of myocardial type—that is, cases in which the major symptoms were those of heart failure—and in these he was unable to find renal arteriolar lesions in approximately 20 per cent. Before accepting such negative results as evidence against the renal origin of hypertension, two questions must be asked: 1. In how many cases were the main renal arteries and their branches examined? 2. How many sections of the kidney were made? The same questions naturally apply to Bell's negative results in other types of cases. In a series of 107 cases associated with a large heart and known hypertension in which death was due to apoplexy or encephalomalacia, he reports negative findings in 14 per cent but positive in 86 per cent; in a subgroup of 42 cases in this series with a large heart but with no blood pressure recorded, renal arteriolar sclerosis was not found in 19 per cent but was present in 81 per cent.

In support of his view that hypertension and renal arteriolar disease are independent of each other, Bell cites his observations on 124 control cases in which the heart was normal in weight and in which there was no clinical hypertension. In this group he reports renal arteriolar sclerosis in 17.7 per cent, but, as he says, "It is to be noted, that the more severe degrees of arteriolosclerosis are very rare in the controls—only 2 in 124 cases." Finally, with almost total constraint, he ends the paragraph thus: "It is clear that grade 1 arteriolosclerosis may develop in older persons independently of hypertension, but the more severe degrees, grades 2 and 3, are very rare in the absence of hypertension." In other words, the type of renal arteriolar lesions found in hypertensives is, quoting Bell, "very rare in the presence of a normal blood pressure." Apparently impressed by his own data, Bell takes a guarded position on the relation of renal arteriolar disease to hypertension because in the summary of his paper just considered he writes "It is clear that severe renal arteriolosclerosis may cause or intensify hypertension." Since there is no established quantitative relation between structural changes in the kidney and hypertension, may not less severe lesions also cause hypertension?

I have assayed the evidence in support of my thesis that a renal mechanism is the cause of arterial hypertension, not only in that observed in primary renal disease, as every one admits, but also in that more common type hitherto called primary or essential hypertension. Disease, either inflammatory or vascular, affecting any organ except the kidneys does not produce a permanent elevation in blood pressure in man. Furthermore, let us recall that experimental impairment of the blood supply to the kidney, and to no other organ in the body, results in protracted arterial hypertension. Finally, just as in the experimental animal, so in man, unilateral renal disease may be the cause of hypertension, and the removal of the diseased kidney may result in a return of the blood pressure to normal. In view of these facts, how can one eliminate the kidneys as the cause of hypertension?

In the light of both experimental and clinical observations, the correlation between arteriosclerosis, kidney disease and hypertension, which, as we have seen, has puzzled physicians since Bright, may now be stated as follows: Arteriosclerosis is the primary disease. This process, when affecting the vascular system of the kidneys, excites a humoral mechanism which produces a widespread vasoconstriction and thus causes hypertension. Whether this is the benign or malignant type depends on the progress and severity of the vascular lesions in the kidneys. Essential hypertension is a manifestation of renal vascular disease, and therefore it appears as one aspect of human arteriosclerosis, the nature of which is, as we all know, one of the greatest unsolved problems in medicine today.

OTOLARYNGOLOGIC PROBLEMS OCCURRING IN FLIERS

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In this paper I cannot hope to present more than an outline of the application of this most important handmaiden of medical science to the physiologic problems imposed on the economy by the stresses and rapid changes of environment encountered in flying. This is particularly true in military flying, in which the accomplishment of the task is considered of first importance and the stresses imposed on the pilot as of secondary significance. In airline or civilian flying every effort is made to avoid unusual stresses to passengers and to planes. In military flying, aircraft are designed to withstand the unusual physical stresses imposed by the necessity to outperform an enemy pilot who has a similarly designed plane and similar motives.

The flight surgeon's task, therefore, is first to select as pilots men capable of withstanding punishing physical and mental strains and, second, to maintain the physical fitness of this group of combatants at as high a level as possible and to surround them with every safeguard possible to protect them against the effects of an environment which was never considered in the design and specifications of the first model of Homosapiens.

It follows, therefore, that aviation medicine is concerned primarily with those conditions which are essentially physiologic and subclinical. Malfunction and disease conditions such as would cause a patient to consult a physician are for the most part disqualifying for the occupation of military flying. When such complaints or disease develop in a flier and extensive treatment or surgical intervention is indicated, he is usually referred

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to specialists in our naval hospitals and dispensaries for treatment.

Quite a number of subclinical conditions which have been found to be incompatible with flying are frequently discovered in the routine physical examination for flying. Many of these are susceptible of correction and are referred to the otologist or the laryngologist for appropriate treatment. Some of these subclinical conditions are hypertrophied or diseased tonsils, adenoidal or polypoid obstructions, septal deviations and nasal abnormalities interfering with drainage or aeration of the paranasal sinuses. Diseases of the middle ear or a history of mastoid disease are considered disqualifying, and postoperative radical mastoid exenterations which have resulted in complete cure are invariably considered as disqualifying for flying. Chronic sinus disease, quiescent but destructive middle ear diseases, and so on, are in the same category.

On the other hand there are often presented relatively insignificant anatomic abnormalities or functional irregularities which have never aroused the interest either of the examiner or of his civilian medical consultant, which are definitely disqualifying in a candidate for aviation because of their known tendency to cause disability under the environmental conditions imposed in flying. When one considers some of the unnatural conditions imposed by flying, such as rapid changes of barometric pressure, extremes of temperature, air blast, propeller blade flutter or high noise levels, and their unfavorable effects on the normal ear or nasopharynx, the reasons for such meticulous discrimination become apparent.

In the following discussion I shall consider rather empirically the effects of flying on these structures, and for convenience I shall divide the subject into five subheads:

1. The nasal structures and accessory sinuses.
2. The middle ear and eustachian tubes.
3. The mouth and pharynx.
4. The acoustic function.
5. The vestibular mechanism.

NASAL STRUCTURES AND ACCESSORY SINUSES

Adequate ventilation is of first importance with regard to the nasal structures and accessory sinuses. At altitudes exceeding 8,000 feet anoxia begins to develop and at higher altitudes may become severe. As the normal physiologic response to anoxia is an increase in depth and rate of pulmonary ventilation, any degree of nasal obstruction which interferes with free breathing is undesirable.

Obstructions due to septal deformity should be removed by surgical means prior to acceptance for aviation. Polypi are usualiy regarded as indications of ethmoidal disease and if found on routine examination are cause for rejection. Any unusual turgidity, dryness, "fish belly" pallor or other indication of allergy is cause for disqualification or for determining on a reexamination. Unfortunately many a young man anxious to get into aviation training has learned in advance of our causes for rejection. Occasionally polypoid degenerative changes are overlooked because the young man has received the collaboration of his own physician, who has judiciously applied a small nasal pack moistened by a vasoconstrictor drug just prior to the boy's visit to the examiner.

In the case of men who have deformed septums it is often the case that we hesitate to advise correction by the usual cartilage resection, because the septal deformity may be but part of the obstruction. Often there is such narrowing of the alar openings that an injudicious removal of septal cartilage may cause even further obstruction of the nostril unless the entire procedure is carried out as a complete nasal plastic operation.

Other things we look for are evidences of chronic sinus disease, for it has been the almost invariable history that flying aggravates the trouble and accelerates its progress toward disabling disease.

THE MIDDLE EAR AND EUSTACHIAN TUBES

Here is another and striking example of man's maladaption to a new environment. Under ordinary conditions only slight changes in atmospheric pressure are experienced, and these changes are readily compensated for within aerated bony cavities in the skull, by connections to the outside atmosphere, through nonpatulous ducts or tubes. These lie wholly or in part within bony structures and are lined with modified, ciliated mucous membrane. The eustachian tube, leading to the nasopharynx from the middle ear, is a good illustration.

The inability under all conditions of barometric pressure variations encountered in ascents and descents in aircraft to maintain equal pressure on the two sides of the tympanum places stress on that structure, which frequently causes discomfort of almost any degree, ranging from mere annoyance to sharp and agonizing pain accompanying severe invagination of this sensitive membrane. Occasionally rupture and hemorrhage may occur.

In studying this syndrome one is impressed by the fact that release of pressure from the middle ear via the normal eustachian tube occurs with little if any discomfort and is usually symptomless regardless of the rate of climb or lowering of barometric pressure. Disturbing symptoms occur on descent or during the return to levels of increased barometric pressure. Partial vacuum within the middle ear causes engorgement of the capillaries lining the cavity, followed by extravasation and actual hemorrhage ("the aero-otitis media") described by Armstrong.

The anatomic structure and relationships of the eustachian tube explain this imperfect function. One may describe it as resembling an upper, larger, and a lower, smaller funnel with their stems in apposition. The upper funnel comprises about one third of the tube and the narrower lower funnel about two thirds. The walls of the upper are osseous with a closely adherent mucous membrane, having it patent at nearly all times. Any expanding gas finds ready exit through a patent tube. Low pressure chamber experiments have proved that even in sudden decreases of barometric pressure there is almost a complete absence of any ear symptoms, which suggests that the expanding gas in the middle ear immediately and easily finds escape through the tube.

In the case of the lower two thirds of the eustachian tube one finds a relatively unsupported collapsible structure with more redundant and turgescent mucous membrane surrounding, and within, its opening into the pharynx. Increase of pressure trying to find its way into the middle ear through this comparatively relaxed tube tends to close its opening more firmly, in which

respect it behaves like a flutter valve. So one finds partial pressure within the upper tube and middle ear tending to produce engorgement of the tubal lining, and positive pressures in the pharynx tending to close the comparatively soft or relaxed portion of the tube.

A vicious cycle is set up and it becomes necessary to employ artificial means of equalizing the pressures. This simply means in most cases bringing the tensor muscles into play by yawning or swallowing movements, closing the nares and blowing just hard enough to pass a bubble of air into the ear. In fact, merely closing the nose and swallowing usually suffices, the reason being that swallowing both exercises the tensor muscles and raises the pharyngeal pressure.

It has been repeatedly observed that in fairly rapid descents from high altitudes the first part of the dive causes no distress, whereas acute distress will begin at between 15,000 and 20,000 feet or at lower altitudes. The increasing density of the air probably has something to do with this. Air of higher altitude is about of the same density as helium or less dense. Rapid descents seem to be as well tolerated as slower descents by a good many persons.

Flight surgeons used to consider it their duty to warn pilots against unnecessary employment of the Valsalva maneuver, carefully explaining to them that any infection present near the ostium of the eustachian tube was likely to be carried into the ear. It was believed that "colds" and pharyngeal irritation were contraindications for the employment of this technic. But the truth of the matter is that in spite of almost universal autoinflation of the ears among our navy pilots, "head cold" or no "head cold" and disregarding sore throats the actual incidence of acute otitis media is found to be no higher among fliers than in the case of mere groundlings. Poppen[1] surmises that this is because gravity, ciliary activity and lymphatic drainage all join in returning minute amounts of infectious material introduced in this way into the larynx.

Occasionally flight surgeons see instances in which every possible maneuver fails to accomplish equalization of pressure—and these unfortunates are usually pitiable objects. When one of these pilots walks into my office, the diagnosis can be made from his facies and a casual glance at the clothing. The face registers acute misery, the eyes are reddened and lacrimose. He hasn't bothered to remove all his flight clothing before seeking relief. An inspection of the tympanum shows a pronounced retraction. If half an hour has elapsed since the accident the membrane has lost its luster and shows severe injection. Occasionally it appears actually hemorrhagic.

Treatment, of course, consists in rapid shrinking of the tissues of the pharynx in the region of the blocked ostia, followed by instruction to repeat the Valsalva maneuver. If this fails it is necessary to introduce air by means of the eustachian catheter. In such cases I prefer the introduction into the ear of hot iodine vapor.

Another important consideration is the character of the gas introduced into the ear by the autoinflation. If one happens to be breathing oxygen and inflates the middle ear with air having a rich percentage of that gas, unfortunate results may follow. A. R. Behnke has described cases in which high concentrations of oxygen have been introduced into the middle ear and absorbed during sleep, producing more or less complete filling of the middle ear by exudate and hemorrhage. Mixtures of gases introduced into the middle ear must eventually come into equilibrium with oxygen percentages present in capillary blood, which are roughly 12 to 14 per cent.

A simple solution is always possible. If the air introduced is alveolar air it will approach the percentage composition of gases in solution in capillary blood and will very quickly come into equilibrium. Therefore holding the breath, exhaling, and inflating the ears at the end of expiration are recommended.

Closely related to this syndrome is the one occasionally seen following occlusion of the normally patent ducts communicating between the frontal and maxillary sinuses and the nasal passages. Much of the nasal and pharyngeal disorder preventing normal equalization of pressures between these spaces and the ambient air is believed to be due to the rather constant irritation of the mucosa by such things as air blast experienced in flying in open cockpit planes, chilling, and noxious and irritant fumes from engines. It is my impression that in older fliers one finds gross evidence of chronic inflammatory changes quite frequently.

Peculiarly enough, typical Bell's palsy, generally believed to be caused by excessive exposure of one or the other side of the face to air blast, is of no more frequent occurrence in fliers than in nonflying personnel. In fact, I can recall having seen but 1 case in an aviator in fifteen years.

MOUTH AND PHARYNX IN RELATION TO FLYING

Except in the cases of those few pilots who seem to become habitual mouth breathers as soon as they put on an oxygen mask, conditions encountered in flying seem to have little noticeable effect. Excessive dryness and irritation of oral and pharyngeal tissues is sometimes seen in these individuals. There is some doubt as to whether such irritation results from high percentages of oxygen or from use of a chilled gas. Pipe stem oxygen breathers used to show pronounced irritation of the mucosae of the mouth and throat after an hour or two. Now that oxygen is used from a mask one sees few signs of redness or dryness even in men who are mouth breathers.

Pressure changes due to rapid climbs often aid the dental office to diagnose a gas pocket in an abscessed tooth.

The usual run of nasopharyngeal ailments, chronic tonsillitis, Vincent's infection, chronic postethmoiditis and sphenoiditis with postnasal discharges occur in flying personnel with no greater frequency than in nonfliers. Chronic sinusitis, if not amenable to treatment, either limits or terminates a man's usefulness as a pilot.

THE ACOUSTIC FUNCTION

The impairment of hearing caused by changes of pressure in the middle ear is a purely transient phenomenon. Progressive otosclerosis seems to be neither benefited nor influenced in its inevitable course by flying. It is noteworthy in this connection that news stories such as those current a few years ago dealing with the miraculous return of hearing in the case of "old Mr. Glutz, who took his first airplane ride yesterday," are rarely seen today.

Higher noise levels which have resulted from more powerful engines, longer propellers and higher speeds

1. Poppen, J. R.: The Ear in Flying, Laryngoscope 51: 974 (Oct.) 1941.

do produce temporary auditory fatigue. Hearing is measurably impaired for considerable periods of time following prolonged flights, but this is considered as evidence of fatigue of the function and not due to pathologic changes. It is true that animal experimentation has demonstrated actual microscopic and even gross damage to the organ of Corti by noise levels exceeding the value of 130 decibels and frequencies of 4,000 cycles per second.

These represent levels of stimulation, however, which are very high, much higher in fact, than are encountered in aircraft. So we call it fatigue of the auditory function, a very convenient term with which to cloak our mere skeleton of information.

Fortunately, under the impetus of the all out national effort to survive, science is also going all out in an attempt to do its share, and well planned research projects have been set up under the direction of competent physiologists, psychologists and engineers, so that the hope may now be entertained that some of the answers will shortly be made available.

The detailed answers are of importance to physicians, to the engineers who design aircraft and to the automotive world in general. Obviously it is highly impracticable to "dampen out" or to "sound proof" aircraft against noise and vibration over the entire range of the auditory spectrum. If science can give the answers as to whether sounds of low pitch but high intensity or high pitched sounds of great intensity are productive of the greatest fatigue, then by attacking the problem selectively it may be easily possible to minimize wear and tear on the tender subjectivity of man.

Air conduction of sound is probably not especially affected by change of atmospheric density, but the production of voice sound is! This represents one of the current problems in voice communication over aircraft radio. If one inhales quite deeply several times a gas of 20 per cent oxygen and 80 per cent helium and then attempts phonation, the resulting sounds which issue forth are startling. One's incredulous ears pick up an emasculated or plaintiff bleat which sounds like a Mickey Mouse animated cartoon. The reason, of course, is that the pitch and intensity of the spoken syllable are changed and weakened by a gas of decreased density. So it is with any respiratory gas mixture at high altitude. Laryngeal and chest reasonance are greatly reduced. The vocal cords in adapting to the less dense gas change their amplitude. Special microphones are being devised to pick up and transmit these weaker voice sounds. Present microphones just won't do the job properly.

Recent investigations as to effect of noise on hearing seem to indicate that higher frequencies of noise intensity of greater than 100-110 decibels will cause temporary deafness but that recovery is usually complete within eight to forty-eight hours, as determined by audiometry.

Time is a factor in such injury; for example, 110 decibels for twenty seconds may cause no demonstrable change to the organ of Corti in experimental animals; 120 decibels for twenty seconds may cause microscopic evidence of damage; 120 decibels for thirty to forty seconds causes much more evident damage.

Pilots who show evidence of hearing loss after years of flying usually show this loss principally in the range of audiometric frequencies 1,024 to 4,096 or higher.

Whether hearing loss is measurably greater in fliers than in persons engaged in other occupations in which there is long exposure to noises of high level is hard to tell.

Now that cockpits in aircraft are provided cowling and much flying in larger enclosed aircraft is being done, I am convinced that damage to hearing should be less than it was a few years ago.

To me, headset, noises and static are much more disturbing in aircraft than any other noises. Head phone static frequently reaches the level of sharply painful stimulation. I am convinced that loss of hearing acuity for higher frequencies is principally due to this one factor. Unfortunately much experiment and research remain to be done before any expressions of opinion can be accepted as reliable.

THE VESTIBULAR MECHANISM

There are two forces in nature to which all animal and plant life are phylogenetically conditioned. One is never conscious of either of them in a normal environment, or when employing a normal method of locomotion. These forces are those of gravity and of pressure. Often the two act to maintain a body in equilibrium with its environment, as in the case of the fish with its swim bladder.

Walking or running, in man, is a series of falling and arresting movement. Here equilibration is said to be kinetic. When one is lying prone or supine, gravity is balanced by a resisting force which exactly counteracts it. This is termed static equilibrium. In resting or in progressing over the earth's surface, man maintains either static or kinetic equilibrium through the unconscious employment of a number of sensory stimuli by which he is made "aware" of his attitude relative to gravitational direction.

The several receptors which give us this awareness are tactile (exteroceptive) stimuli, labyrinthine, visceral, deep muscle or pressure (proprioceptive) stimuli and stimuli mediated by the special senses of seeing and hearing, the so-called teleoceptors. Poppen [2] has said "It so happens that in flying we can have ultimate recourse to only one," meaning, of course, vision.

In learning to fly, one has to learn to ignore most of those stimuli on which, as a terrestrial being, one has placed chief reliance and to substitute therefor a completely visual adaptation. Some of these sensations, particularly the labyrinthine, merely serve to confuse the flier. In the early days of aviation much effort was expended by the physiologist and the otologist, and many profound and elaborate theses were written in an attempt to explain the importance of this function to the business of aerial equilibration. Many famous differences of opinion arose as to which function ranked first in importance, visual, vestibular or proprioceptive. The otologist favored the labyrinth, the ophthalmologist naturally ascribed greatest importance to the visual organ, and the old time aviator tolerated both views but insisted on "flying by the seat of his pants," and a railroad track was his most valued navigational instrument.

Times have changed. We still describe the function of the labyrinth, but only to excuse its misbehavior. "Seat of the pants" stimuli, when a plane is in normal flight and in stable aerodynamic relationship to all forces acting on it, are of precisely the same value as when the seat is in firm contact with an automobile

2. Poppen, John R.: George Washington University and School, Mid Winter Course in Aviation Medicine, 1940.

cushion. But when the plane executes maneuvers in which these aerodynamic forces become of much greater magnitude or amplitude, corresponding degrees of labyrinthine stimulation occur, which are not only misleading but deeply disturbing. These overpowering stimuli result from such maneuvers as snap rolls, power spirals, spins and prolonged tight turns.

The degree of labyrinthine stimulation under such circumstances produces concomitant nystagmus and vertigo and affects the higher cerebral centers. One becomes acutely conscious of the stimulus and acutely misinformed as to orientation.

Illusions as to their position within the plane as well as orientation of the plane in relation to the earth's surface are familiar to most pilots who have done much flying, and they occasionally refer to a phenomenon known to the fraternity as "the leans." Take a specific case in which a plane "on instrument" flight in fairly smooth air has undergone a gradual depression of the right wing. The pilot from his instruments is made aware of this and by applying the left aileron brings the wing up level on the artificial horizon.

The sinking of the wing was gradual and was not sensed by vestibular function. The bringing up of the wing was more rapid and caused vestibular stimulation, and as a result of this leveling the pilot feels as though he were now actually leaning to his left, and he responds by leaning to the right, or to what his subconscious awareness tells him is an upright position.

If experienced, the pilot, by referring to his instrument, becomes aware of the false attitude and is able to force his illusion from his consciousness. If inexperienced or if he does not refer to his instruments, repeated depressions of a wing out of trim and recoveries will often find the pilot leaning far away from the vertical after several corrections. This does not happen if the weather is clear and the pilot is able to fly "contact."

I subscribe to the idea that the visual function is the most important. Certainly it dominates the others. For example, following recovery from a fast right spin the pilot, if flying blind, will receive from his overstimulated labyrinth the very real illusion that he is now spinning to the left. He makes necessary correction and again reverts to a right spin.

If there is any degree of horizon visible, an exactly opposite phenomenon often occurs following such a spin.

After rotation to the right—and arrest of rotation—

1. Endolymph flow or pressure is to the right.
2. The slow component of ocular nystagmus is to the right.
3. The visual illusion is that the horizon is still sweeping to the left and that the plane is turning to the right.
4. Corrective procedure is to follow the horizon, and a left spin often results.

All this in spite of the fact that the vestibular illusion is that of turning to the left. The eye says "no," we're still turning "right," and the conscious mind accepts the visual information and suppresses the labyrinthine.

Vertigo is the disturbance resulting from disharmony between the organs of equilibrium. The two most highly specialized being the labyrinth and the oculomotor apparatus, it is easy to believe that conflicting impressions received by the subconscious from these two can cause the severest symptoms. The visual function, being most important in flying, has led to the development of the paradox use of the eyes alone and to the exclusion of all other senses whenever one must "fly blind."

ABSTRACT OF DISCUSSION

Dr. R. J. Hunter, Philadelphia: The commander described the sensations which come to an aviator in a tailspin or in the beginning of a tailspin. He told how, when the wing is low, and one suddenly comes up and stops, the person, of course, has a sensation of movement in the opposite direction, if the eyes are closed, and, if the eyes are open, he will have the illusion in the other direction. Those are all things we are well acquainted with in the question of equilibration, and they are functions which are inherent in the human mechanism. The commander said in his paper that he felt that those sensations should be suppressed. These functions of the labyrinth come from our primitive ancestry long before we had ears and eyes, and they are so basic that they are an integral part of the work of our eyes and our ears. I agree with Commander Carson that the eyes are the dominant factor in equilibration. In other words, as one moves or as objects move about one the impressions come in through the sight, are passed on through the eyes, through the muscles of the eyes, to the internal ear, and we react accordingly. One unfortunate thing with all this business of equilibrium is that the literature is complicated. If one starts to tell about the pathways and to tell about von Bechterew's nucleus, and so on, the students and the listeners are soon fatigued. They refuse to listen. But, as a matter of fact, the actual reactions are so simple that any one can understand. They are so simple that every acrobat who learns to do something has, of his own volition, learned how to perform those functions. Every time we cease moving in a given direction, muscles are automatically put into play to pull us in the opposite direction. The commander's mention of the aviator about to take his tailspin reminded me of when I went to Park Field in May 1918 as a flight surgeon in the army. There were mottoes all around the border of the mess hall, one of which was "Beware of the deadly tailspin." Now, about that time a French aviator had discovered that by putting his head down in a certain position and holding his stick and his rudder in the right way, he could come out of a tailspin and prevent himself from going into another. In other words, that man empirically discovered what to do to overcome these unfortunate sensations that the commander calls attention to. That is a clue to a great deal that could be done at present to minimize the sensations. We have heard from the psychologists about suppressing our desires, and now the commander wants us to suppress something in addition. He wants us to suppress these sensations that we get from the equilibrium apparatus. Instead of suppressing them, let us try to understand them and act accordingly.

Dr. A. H. Andrews Jr., Chicago: Hermann in Austria has described a condition which he calls submucosal hemorrhage of the paranasal sinuses, which is the result of very rapid descent during the dive flying. He has described the roentgenologic aspects of this particular condition and the treatment. I should like also to mention the work of Roth, Ivy and myself with regard to the use of altitude in the treatment of paranasal sinus disease. We have treated over 100 patients, taking these patients up to an altitude generally of 8,000 feet in a decompression chamber. In this group only 4 have had the complication of aero-otitis media, and every one of these patients had an acute cold when he was taken up, and the trip was definitely contraindicated. In the presence of sinus disease and altitude we did not have the aero-otitis media in as large a percentage of cases as one would expect. We encountered eustachian obstruction not infrequently, and we handled those cases in this way: On the way down, if the men experienced eustachian symptoms which were not relieved by swallowing or drinking water or chewing gum, they were taken back up slowly until the eustachian symptoms disappeared and then taken down; as soon as the symptoms recurred, up again, working gradually, taking plenty of time, rarely taking more than half an hour. The question somes up: Is this applicable to our fliers by the use of a decompression chamber after they have come down, taking them back up, and bringing them down more slowly, and in steps? A third point concerns research that a group with which I am associated has been doing on the recording of the movements of the ear drum under the Valsalva

maneuver, and under controlled pressures applied to the ear drum through the nose and mouth. It has been possible to get a very nice tracing of the movement of the ear drum. In working this out, I used myself as a subject and to my surprise found that my right drum had much less excursion than my left drum. In childhood I had chronic otitis media for a number of years and have a little impairment of hearing in that ear. It was demonstrated that by this method of examination there was definite impairment of motion in the middle ear. Of course, the thing we were interested in was not that but, rather, working out quantitative methods of expressing eustachian obstruction. That brings up a point which I feel is very encouraging, and that is merely that I believe that our clinical otology is going to see rapid advancements as a result of the research and study that is being done on the eustachian tube in connection with our war effort.

DR. HERMAN J. STERNSTEIN, Boston: I was interested in Dr. Carson's observations concerned with the effect of nasal obstruction on the patency of the eustachian tube. In experiments being conducted at the Massachusetts Eye and Ear Infirmary I have attempted to correlate the effect of nasal resistance on tubal patency and sound transmission. Nasal resistance determinations were made by the method previously described. Patients with normal and obstructed noses were studied with a new type of rebreathing apparatus designed to permit a maximum range of pressure up to 25 cm. of water regulated on a time factor basis. By means of an airtight rubber tube connection for sipping water it was possible to measure accurately the equalizing efficiency of the eustachian tubes within the determined range of pressure at each swallow. It was found that in the obstructed nose the equalizing efficiency was definitely impaired and decreased. After the administration of amphetamine or neosynephrin it was found that the tubal patency and equalizing efficiency was improved by 50 to 75 per cent. The effect of tubal pressure changes on sound transmission was elicited by the Weber test. Sound lateralized readily to the more patent tube. In tubal obstruction lateralization and failure to equalize sound was quickly indicated by the patient and the result measured on the manometer.

DR. LEON D. CARSON, Washington, D. C.: I am sorry I did not have the opportunity to finish the paper, having slightly miscalculated the reading time. Dr. Hunter's remarks were very pertinent. I do not believe there is any disagreement between Dr. Hunter and myself as to suppressing stimuli from the middle ear. In my paper I developed the thesis that what we are teaching our aviators to do in cases of conflicting stimuli existing between visual function and the middle ear is to disregard any impressions as to their position relative to space or to the plane and to depend solely on the visual function. This is rather easy to do, as one almost involuntarily depends, first of all, on the visual function in orientation in space. Dr. Andrews brought out several points. I have gone over the work which is under his direction and have seen several reports of treatment of middle ear disease with variations of barometric pressure, induced by changing pressures equivalent to about 2,000 feet altitude; sort of a churning back and forth, using a low pressure chamber. Of course, without attempting to go too deeply into how much actual aeration is accomplished by this means, I should like to bring out that we are dealing with military plunges from somewhere around 30,000 feet to as low an altitude as necessary without any regard for equalization of pressures. One other point brought out, namely, research dealing with the excursion of the tympanic membrane: We have learned in our own low pressure chamber experiments some interesting things. If our subjects to the chamber, who commonly experience difficulty with equalization of pressures in the middle ear, are distracted by some other momentous event—in other words, if they become a bit anoxic or suddenly worried about their physical condition and forget about this problem, they frequently have no trouble. Another thing discovered recently is that in chambers where we have sound equipment and we play a piece of popular music during the descent, so that it is being recorded and transmitted to the individual earphones, most subjects have no trouble. It may be that this function, like respiration, is one that carries on best only when we do not pay too much attention to it.

HEALTH PROBLEMS IN WAR HOUSING

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There is little precedent in this country for action with regard to the health problems arising in connection with wartime public housing. The United States entered the first world conflict late in the course of the war. War industries generally made use of existing plants, enlarging them or stepping up production. Local communities were generally able to house the new workers fairly readily.

In this war, production is on a greater scale. We are supplying other nations with huge amounts of equipment. We have had little time for preparation. As a result of the rapidity with which production has had to be organized, severe dislocations in population have occurred. Almost overnight communities have arisen in the midst of barren regions, and towns have become cities without warning.

PUBLIC HOUSING

These rapid changes have created extraordinary housing problems. As a result of the unbearable and dangerous living conditions in some regions, many workers left their jobs and moved to other defense areas. Industrial production was hampered seriously by such constant shifting of workers. Public war housing undertook to solve this problem in the quickest way possible.

But large new housing projects, some of them in areas previously but sparsely settled, also present many problems related to health and sanitation. Such problems are water supply, sewage and garbage disposal, environmental sanitation including mosquito control, hospital, medical, dental and nursing care, recreation, safety and health education. The situation with regard to these needs in war housing projects is not one in which we can afford to adopt a *laissez-faire* attitude. It concerns every one of us in a most vital way. Approximately 435,000 dwelling units are occupied, under construction or in the planning stage. This represents at 3.5 persons per family more than 1½ million tenants, of whom well over ½ million are, or will be, actively engaged in work which means the difference between victory or defeat for this nation and its allies.

For this reason, public housing authorities have naturally been interested in determining the availability of the health and sanitation facilities necessary to protect their tenants, and in making such facilities available when they are lacking or inadequate.

Federal housing projects constitute a true part of the communities in which they are located. Their only immunity is from taxation, being otherwise subject to civil and criminal law except where located on military reservations. However, payments approximate to normal taxes are made to local communities in lieu of taxes. Public services such as police, fire and health protection are available to the tenants as well as to other citizens in the community, although in many instances such services are so inadequate that they may be considered unavailable.

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SANITATION

When heterogeneous groups of people with varying degrees of immunity against communicable disease are thrown together, with unknown "carriers" of disease in their midst, they are particularly susceptible to epidemics. Careful attention must therefore be given to basic sanitation. It has been necessary to install protected plumbing. To this end, experts have been called on to establish new plumbing codes. Individual modern plumbing has become a reality to thousands of families for the first time.

Many such persons are also enjoying a safe water supply for the first time. This should result in a decrease in the incidence of water borne diseases. Those accustomed to contaminated wells and other impure sources are now getting their water from city mains, which, with the aid of federal funds, have been enlarged in order to take care of the increased demand.

New military and industrial communities have also been threatened with overloaded sewage disposal systems. Outmoded or inadequate treatment plants have been, and are being, enlarged or replaced in many places to handle excess loads created by population growth. Studies of stream pollution have had to be made in order safely to expand existing disposal systems. Engineers from the district offices of the U. S. Public Health Service have been called on by local and state health departments to assist in this work. Where a local sewerage system is operating at capacity and funds have not been available for enlargement, public housing has constructed its own sewerage.

All such health and sanitation operations should be undertaken in close cooperation with local health authorities. In this way, maximum effectiveness is obtained. When local health agencies have not been consulted by the housing authorities, difficulties have arisen. In a large Eastern city, a housing site was chosen in swampy land. The area was filled in and construction was completed by the local housing authorities before it was discovered that the cellars were flooded. Even then the housing people did not go to the health department for assistance. Such a situation could have been prevented simply by drainage of the swamp area in the beginning. In another instance, water mains and sewer lines were laid in the same ditch. Through a close working relationship between housing and health, however, many departments have developed housing as a specialty within the field of public health itself. When housing and health activities are harmoniously combined in this fashion, with the aid of federal consultation and funds there is a minimum opportunity for the errors which defeat the very purpose of public housing.

When for strategic or other reasons, air fields or ordnance plants are constructed many miles from a town or city, it is probable that there may be no health department whatever. At best, if a health department does exist, its facilities are insufficient to handle a population that is often doubled or tripled. This is especially true where the health officer is serving part time in his official capacity and is also in private practice.

Public housing in wartime is necessarily located as close to an army or navy reservation, air field or war plant as is possible under local conditions. The project may be constructed on an army post or adjacent to one, as many as 5, 10 or more miles from the nearest town. It cannot be expected that a fully organized, perfectly functioning health department will be available in each of the hundreds of areas now engaged in essential production. On the other hand, it is to be expected that, as soon as an area serves war needs, the local health department will anticipate or attempt to meet all public health problems. Any loss of man-days of work due to ill health means a proportionate increase in the duration of the war. Already, nonindustrial illness accounts for 90 per cent of the 400,000,000 man-days lost annually from work in industry. A large part of this illness is preventable or reducible.

PUBLIC HEALTH SERVICES

In order to face this situation realistically, it has been necessary to establish public health services where none existed before or to bolster health departments whose personnel has been depleted by the calling up of reserve officers. Unfortunately, the distribution of these additional facilities has not always been effected so as to benefit those new or outlying sections of town where the need is greatest. A large percentage of the war workers are situated in new residential areas where clinic and other health services do not exist. Although these workers may utilize services available elsewhere in the community, too many obstacles, chief of which is distance, stand in the way. Transportation facilities are often poor. With the advent of the rubber and gasoline shortage, this situation has become worse.

War workers congregate from many parts of the country. Many of them have not previously been exposed to health department activity. These people are not acquainted with the preventive services ordinarily provided or with their importance. But if all tenants and their families were aware of the importance of protecting their health in every way possible, it is doubtful whether a very large percentage of those needing service would seek it in view of existing obstacles.

In view of these circumstances, space has sometimes been created or adapted for clinic use within the housing projects themselves. This is done in one of three ways: 1. A dwelling unit may be converted into a health center. 2. A building may be constructed for the purpose. 3. Space may be set aside in the administration building. In any case the service is operated by the local or state health department. Tenants are attending these clinics in increasing numbers.

As an example, there is a housing development with 350 persons in a Southern city. It is located somewhat outside the main section of the city. No clinic or public health service facilities were available which did not involve a tedious bus and trolley ride into the center of the city. Several cases of communicable disease occurred in the area surrounding the housing project. The children both inside and outside the project play together. With the excellent cooperation of the local board of health, a clinic was established in two adjoining dwelling units. It now serves all persons in the entire area. A complete program is providing clinics for vaccinations and immunizations, preschool physical examinations, tuberculosis, venereal disease, crippled children and antepartum work. There are classes and demonstrations for adult education. Some of the families have been vaccinated for the first time. Well baby conferences have not only improved the health of the children but, unfortunately for the busy physicians, increased their work as a result of referrals.

The foregoing are, briefly stated, the problems connected with the preventive aspects of war housing health

and sanitation. The most important consideration in evaluating this work is that it concerns essential service to concentrated groups of war workers, every one of whom has been certified as eligible for a project dwelling by a military post commander or by the personnel director of a war plant. By serving such housing areas we are reaching, without waste motion, these key people as well as many in the immediate vicinity of the project.

Now let us consider the subjects of hospital and medical care.

HOSPITAL CARE

The hospital problem is very serious. Although public housing tenants are not the only ones affected, lack of hospital facilities is a matter of serious concern to them. Eighty per cent of bed capacity is considered the maximum at which a hospital can operate efficiently, yet many institutions continually have occupancy rates of 100 per cent and more. Patients are cared for in hallways and, in some places, in cellars. There is simply no choice in the matter. When a hospital is crowded and patients are brought in in an emergency, they must be put somewhere. Often they must be held in emergency rooms for several hours.

An even worse situation exists with regard to delivery rooms. Almost all industrial and military communities have a high birth rate. Regulations for the protection of delivery rooms are violated frequently, also without choice. Patients are sent home after three days of postpartum care to make room for others. Many operating rooms are in use practically twenty-four hours each day, with scarcely enough time for proper cleaning. Increased numbers of highway accidents have added to the troubles of the hospitals, as has the diminution of staffs.

More than seven hundred requests for government aid in the construction of new hospitals, additions to existing hospitals or health centers have been received from approximately five hundred communities. Each request has been studied by the U. S. Public Health Service, and more than three hundred of the proposed projects have been recommended as justified by wartime conditions and needs.

MEDICAL AND DENTAL CARE

A problem of equal magnitude is the provision of medical and dental care for occupants of war housing projects. Under ordinary circumstances such needs would readily be met by local doctors, but wartime conditions change the picture completely.

At the beginning of the defense program, some towns were able to absorb considerable numbers of defense workers without too much shock. The degree to which the impact was felt depended largely on the size of the town. For example, a city of 30,000 or 40,000 could handle several thousand additional workers; the same number entering a town of 500 created unbearable situations. In some of the areas there were enough physicians and dentists to satisfy normal demands; in others a shortage already existed, if judged by any adequate standard. But, regardless of what the situation had been, with the influx of newcomers it was not long before the ratio of professional men to population was severely upset.

In large cities the effect of an increased population is not so noticeable. There the relative excess of doctors may take care of expanding needs for some time. A noteworthy exception is the Washington, D. C., metropolitan area, where the population has increased from approximately 965,000 to over 1,150,000. With the entry of many local physicians into the armed forces, it is now often difficult for newcomers to Washington to secure medical services. A patient may phone as many as five or six practitioners before he succeeds in getting one. Naturally, the physician gives preference to his regular patients, and he may be so busy that he is unable to make a home call to a new patient until the day after the request has been received. Offices are so crowded that waiting for several hours is commonplace. Likewise, dental care can be secured by many persons only after two or three weeks of waiting. By working long hours at a strenuous pace, physicians are striving to serve all the people who require their attention and at the same time maintain a high quality of service.

Small cities and towns, on the other hand, generally present a more extreme picture. For example, the population in a town in the South has grown 900 per cent—from 500 to 5,000. There were, and still are, two physicians but no dentists. One of the doctors spends half of his time as mayor. Thus there is a ratio of three tenths of a doctor per thousand of population. The nearest hospital is 27 miles away, and it is overcrowded. As a result, many deliveries are performed at home. Home deliveries were by no means unusual in this region before the boom, but for many of the people living in that town today home is nothing but a temporary shack or a trailer.

Consider a larger city in the Far West. The population was 15,000 in 1940. At present it is over 30,000, and it is still growing. The doctors there now serve 65,000 persons, including those outside the city limits. The number of physicians has decreased from about thirty to twenty. Again, this is a ratio of less than one third of a physician to 1,000 inhabitants. Here public health nurses provide the only medical care for cases of communicable disease because physicians do not have the time. Doctors are working day and night with very little rest. The quality of care is dropping, because a physician cannot treat 40 or 50 patients a day and do them all justice. Specialists' services have become unavailable because the practitioners have entered military service. This would be serious enough in peacetime, but in wartime it is a matter of grave importance to the nation as a whole because this community is playing a vital part in maintaining our navy at fighting strength.

These situations are cited only to show how they might properly be remedied. Where health departments have been understaffed, the U. S. Public Health Service has lent professional personnel, selected and trained especially for emergency duty in such areas. At the present time, approximately one hundred and fifty physicians are assigned to such duty with state or local health agencies in critical areas throughout the country. Including public health nurses, sanitary engineers and other specialists, almost seven hundred professional health workers are now being utilized for services of this type. Many of them have been assigned to federal housing areas or to activities which serve the tenants therein.

In every area where more physicians and dentists are sorely needed, their number is decreasing instead of increasing. Individual physicians and dentists as well as medical and dental societies have asked, and are asking, for help. They are urging that more practitioners be sent to their communities to relieve them

of some of the overwhelming burden under which they are now struggling. This is a reversal of the usual situation, in which additional competition is apt to be discouraged. Actually, some men are ready to enlist in the armed services simply to escape the unbearable strain of practice under present conditions.

One solution, as far as housing project areas are concerned, is to have one or more practitioners serve primarily the housing projects. Such a method would take care, at least in part, of a large group consisting almost entirely of new families. It would save the time and energy of many doctors who would normally be summoned individually for home calls. It would also mean important economy of tires and gasoline for both doctors and patients. Another remedial measure would be to have professional men who are ineligible for military service, and women practitioners, relocated in towns where they are badly needed.

Housing authorities must also be concerned with the number and types of available specialists. A few thousand tenants are unable to support specialists, but it is to their interest to have specialists readily accessible. Again, this serves to emphasize the point that housing developments are not usually self contained, independent units but rather an integral part of the entire community.

What has been said about medicine also applies to dentistry, but to a greater degree. The ratios of dentists to population last year were in general about half as high as those of physicians. This year they are, of course, even lower. Dentists are needed to supply care for public housing tenants as well as for the communities in which the projects are situated.

CONCLUSION

If the health of war workers is to be maintained, it must be done by a concerted attack on all aspects of the problem. This includes the provision of adequate public health services, sanitation facilities, medical and dental and nursing care, industrial hygiene and accident prevention services, and mental hygiene programs. Public housing is simply a cog in the whole wheel of production, but the tenants constitute the wheel itself. In a large measure, the war will be won or lost by these tenants.

ABSTRACT OF DISCUSSION

DR. JOSEPH W. MOUNTIN, Washington, D. C.: Dr. Freedman has accurately described the situation but, I fear, he has understated its implications. There has been a vast shifting of our population without any corresponding adjustment of community services. The sudden influx of people into the new cantonment and war industry areas has actually overwhelmed such meager sanitary conveniences and professional resources as these communities normally possess. Through the Community Facilities Act the federal government has endeavored to assist the affected towns in expanding water supplies, sewerage systems and hospital accommodations; however, the shortage of critical material and manpower is seriously interfering with the program, and I fear it may ultimately defeat the purposes of the act. Nearly a year ago the Public Health Service called attention to a developing situation in respect to shortages of professional personnel and offered to be the medium through which physicians and dentists desiring relocation might get information concerning the communities needing their services. Numerous inquiries have been made by prospective candidates for such openings, but to date we can take credit for the placement of only five physicians and two dentists. The reasons why this scheme has not been more productive of results may be summarized in two statements: Young physicians, because of uncertainty in relation to Selective Service, do not care to make the financial outlay incident to opening an office. The older physicians are now busy in their present locations and do not care to accept the inconveniences and the hazards of boom town practice. We have evidence that the present difficulty in securing medical care is the cause of much industrial absenteeism. As the manpower shortage becomes more acute, neglected illness may seriously interfere with the successful prosecution of the war. I am convinced that the undirected forces of supply and demand will not insure the most effective utilization of the depleted professional resources during the present national crisis. I further believe the need of medical care for workers in war industries, and especially for those in boom towns, is so great that it should receive appropriate consideration in the future from the Procurement and Assignment Service and other agencies concerned with the provision of medical and dental services.

DR. A. S. LEVEN, Chicago: In this all out war production, machines alone cannot win a war. It requires human beings to operate machines. These individuals must be healthy people to produce efficiently. It has been estimated that workers losing one month's time from work would build two heavy cruisers, four hundred and forty-eight medium tanks or thirty-two thousand light tanks. It has been stated that nonoccupational diseases far outrun those arising out of or in the course of employment, causing many man hours' loss in production. There is a leak in our productive capacity, and this points definitely to a lack of adequate medical care of our industrial and civilian medical needs for war production efforts—a luxury which we can ill afford at this time. Our armed forces receive the very best attention possible whether the illness is due to influenza, venereal infection or a bullet wound. Our army of workers, and a far too great a number of our population who are indispensable in this production scheme, have no such facilities. Our home front must be considered in the same manner as our armed forces on the battle front. Unemployment is a source of waste to our national economy. Its concomitants, malnutrition, unnecessary ill health, bad housing, are a waste to our national health. The waste of human ability and skill which our educational, economic and social systems have tolerated and permitted in the past must no longer be tolerated. It can, it must, it will be eradicated.

DR. H. R. O'BRIEN, Hartford, Conn.: To what extent are these new housing projects being supplied with clinic quarters, rooms? I have seen one that has been and several that have not. If the doctors are going to work in the community or near the community, they need clinic quarters.

DR. GRADIE R. ROWNTREE, Louisville, Ky.: Should people in housing projects be furnished medical care by municipalities, free?

DR. DONALD K. FREEDMAN, Washington, D. C.: In regard to the provision of favorable health facilities, there might be two types that we talk about, preventive and therapeutic. We are thinking of the entire picture, which concerns both measures. Specifically, the federal Public Housing Authority which now embraces all the public housing agencies formerly distributed among some fifteen governmental agencies, is attempting to encourage the provision of both types of facilities by cooperating with physicians and dentists and with public health departments to make available whatever space is necessary. In other words, a physician who desired to relocate in a housing project where, in a defense area, there was an inadequacy of medical care would be able to work out an arrangement with the public housing people to have an office there and possibly living accommodations. Now, housing areas of the type that we mention may have anywhere from a hundred people up to twenty thousand people in a single new housing community, and almost all, especially the larger ones, have a serious need for additional physicians. A new community of fifteen or twenty thousand which is built outside a city or town or in the wilderness does not have much medical care, usually no physicians, no government doctors, or any other, unless a doctor comes into it on a voluntary basis and desires to establish practice. The same type of situation exists with clinical facilities for a public health department. If the local health department is interested in supplying the public health needs that Dr. Emerson speaks about, for these workers and their families and others, they may make use of space in the housing project

to conduct the types of clinics necessary. In regard to the free medical care given by municipalities, it certainly is not the intention or the desire of the federal Public Housing Authority to give such care to occupants of defense or war housing. The tenants of housing projects are considered in exactly the same relationship as any other persons to the community as a whole. They are part of the community. The tenant should pay for medical care in the same way that others do; however, it is true that many of the tenants in housing projects earn as low as $800 and $1,200 a year. They may have families, up to three or four or more children, so that some percentage of them is in the category in which we find the very lowest income groups.

AMPUTATIONS IN WAR

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Colonel, Medical Corps, U. S. Army
BATTLE CREEK, MICH.

Experiences in World War I demanded an order that no wound should be closed by primary suture. Even with the advent of the sulfonamide derivatives it is not believed that primary suture is safe in extremity surgery under war conditions. This was further proved by reports of infection which followed débridement, the application of sulfanilamide and primary closure of wounds at Pearl Harbor and by reports in the *Lancet* from experiences on the Libyan front. All wounds closed by primary suture or tightly packed were found grossly infected when the patients arrived at the base in Egypt.

Methods of amputation might be classified as follows:

1. The guillotine or open method: circular or flapless type; flap type.
2. The closed type of amputation (amputations at site of election where flaps are fashioned and closed by primary suture).
3. Repair of the guillotine stump: (*a*) Plastic closure. (*b*) Plastic resection. (*c*) Reamputation.

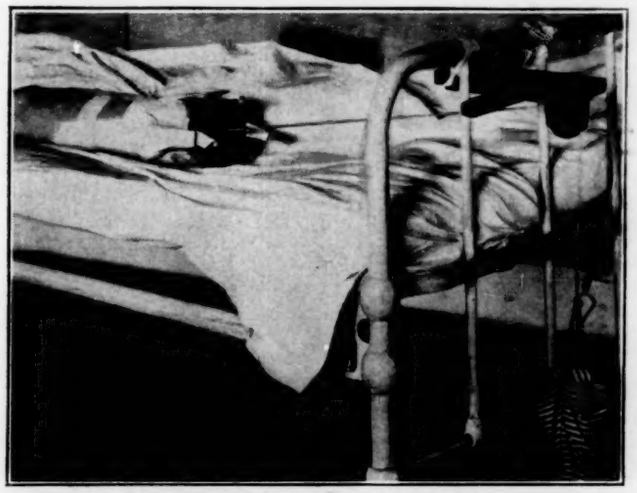

Fig. 1.—Skin traction for which four longitudinal adhesive strips are used, with two applied circularly to prevent retraction of the soft tissue, following the circular, flapless guillotine amputation. The hexagonal spreader has four buckles to which to attach the adhesive traction, the rope pulley on the bed end and the weight to effect traction. (Amputations, Lewis's Practice of Surgery.[1])

The word "guillotine" is a misnomer; the circular guillotine amputation is not a "chop" amputation, as the word implies. In the classic operation the skin of the extremity is cut through circularly around the extremity and allowed to retract; the fascia is likewise cut through at the level of the retracted skin; the muscles are cut circularly, the outer layers first and, as they contract, deeper layers, until the bone is reached. The periosteum is cut through circularly with a knife, at which point the bone is sawed through and the extremity removed. No periosteum or endosteum

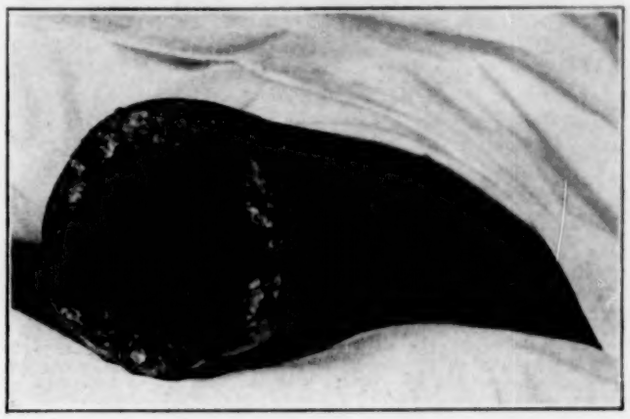

Fig. 2.—Appearance of wound after completion of guillotine flapless amputation through a compound fracture with chronic osteomyelitis and sequestration with destruction of the knee joint and an unhealed amputation through the leg.

is removed, as this leads to infection of the bone and sequestration. Care is taken not to strip the attached periosteum from the bone by muscle retraction, as spur formation may occur.

Large vessels are doubly ligated by no. 2 plain catgut, silk or cotton thread. Muscle bleeders are best transfixed by suture, fine material being used. Large nerves are pulled down, ligated, injected above the ligature with 95 per cent alcohol, cut with a knife and allowed to retract with the intramuscular septum. Small nerves are pulled down, crushed with forceps, cut and similarly allowed to retract. On completion of the amputation the stump is concave, the sawed end of the bone being shorter than the skin, fascia and muscle layers of the extremity.

An oblique rather than a true circular method may at times be employed to advantage.

In the flap type guillotine, flaps of skin, fascia and muscle are fashioned and are either pulled together over the stump end by adhesive, if the wound is not badly contaminated, or are packed open if badly infected.

If early secondary closure appears possible and the patient will not have to be transported elsewhere, this method may be indicated. The method is objectionable in that it requires more shortening of the bone than the circular type, but this may not constitute an objection if there is an excess of normal soft tissue. Flaps interfere with proper drainage if infection is present or develops; the area of exposed tissue is greater; the flaps frequently slough and become deformed during healing, and the main objection is that flaps interfere with proper and essential skin traction after amputation.

POSTOPERATIVE CARE

Immediately following the circular or flapless guillotine[1] (fig. 1), four strips of 2½ inch adhesive are applied, equally spaced, to the skin of the stump, extending to the margin of the wound and secured by two

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Released for publication by the War Department Manuscript Board, which assumes no responsibility, other than censorship, for the contents of this article.

1. Kirk, N. T.: Amputations, in Dean Lewis's Practice of Surgery, Hagerstown, Md., W. F. Prior Company, 1930, vol. 3.

or more encircling strips. The adhesive beyond the stump end is folded back on itself. The four ends are secured to a hexagonal wooden spreader by four buckles that are secured to the spreader by webbing and tacks. A cord from a hole in the middle of the spreader runs over a pulley on the foot of the bed to which is attached

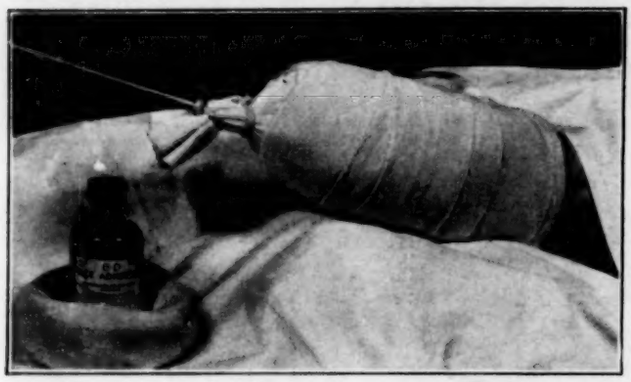

Fig. 3.—Ace Adherent (skin glue), stockinet and bandage used to effect skin traction as a substitute for zinc oxide adhesive. The dressing of the stump is held in place by the stockinet. This shows application of skin traction using stockinet and Ace Adherent.

a bag in which 6 to 8 pounds of weight is placed to produce traction.

A piece of stockinet of proper size may be secured to the skin of the stump with "Ace Adherent" (skin glue) (fig. 3), in lieu of the adhesive plaster. The traction must be continued until the wound heals, which in a thigh will require some six weeks (figs. 4, 5 and 6). The gauze that has protected the stump end while the skin traction was being applied is removed, from 5 to 10 Gm. of sulfanilamide or a mixture of this drug and sulfathiazole is rubbed well into the stump end and the wound is covered with petrolatum or bismuth iodoform paraffin paste gauze. The wound is dressed and bandaged and is redressed infrequently unless severe infection occurs. It should then be treated with diluted

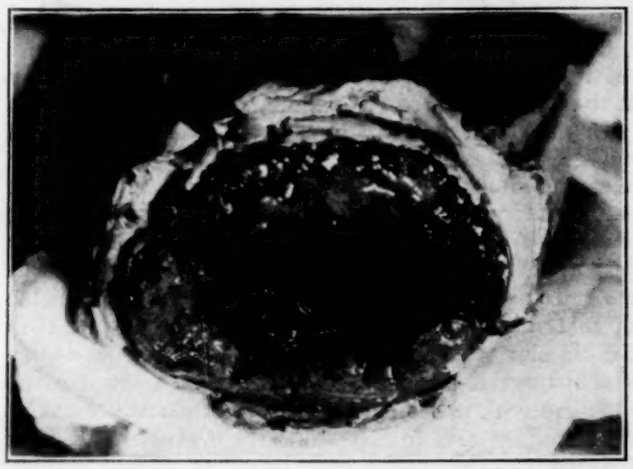

Fig. 4.—Appearance of guillotine flapless amputation of thigh six days after operation necessitated by infected knee joint; the stump is being treated with diluted solution of sodium hypochlorite.

solution of sodium hypochlorite, or a daily pack of azochloramid may be used until all sloughing of tissue disappears (fig. 7).

If skin traction is not applied and continued, a conical stump is produced with projecting bare bone covered with a wide area of granulation tissue below the retracted skin margin several inches above the end of the bone. The soft tissues become fixed, circulation is cut off below, the bone becomes infected and the soft tissues frequently cannot be even partially pulled down by the late application of traction. Plastic resection with further bone shortening will be necessary for closure.

If the patient is to be evacuated, traction may be maintained by the application of a Thomas or an Army half ring splint and elastic fixed traction to the splint end. The stump is secured to the side bars of the splint by bandaging.

The primary (immediate) amputation may be necessitated by destruction of circulation to all or to part of an extremity, for the control of hemorrhage or to remove a hopelessly destroyed extremity or one which has been pinned down or crushed by falling masonry or a heavy weight before fluid becomes lost through dilated capillaries or absorption of toxic products occurs. A traumatic amputation may have occurred and only a débridement of the remaining extremity may be required, or it may be necessary to sever only a few remaining strands of muscle or skin with a snip of bandage scissors.

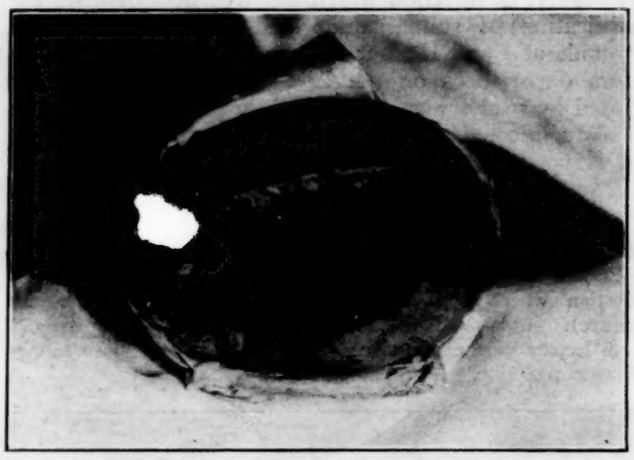

Fig. 5.—Same stump as in figure 4 twelve days later. Traction that was begun at the time of amputation is being continued. The adhesive traction may be seen rolled back.

The secondary (delayed) amputation may be necessary several hours or days after injury; the usual indication being infection, gas gangrene, a septic joint, chronic osteomyelitis, recurrent uncontrollable hemorrhage or gangrene from destroyed circulation.

SITE OF AMPUTATION

The site of amputation should be the lowest level possible, regardless of the utility of the stump. If amputation is indicated in an extremity in which a compound fracture has occurred, the proximal fragment of the fracture should represent the "saw line" if sufficient soft tissues survived the injury to accomplish this. Amputation above this level is a useless sacrifice of bone length unless a higher site is necessitated.

In the secondary or delayed guillotine, the saw line should be as low as is consistent with saving the patient's life and removing the focus of infection. This is usually a question of surgical judgment. I have repeatedly obtained positive cultures of Welch's bacillus from the tissues of a guillotine stump after amputation at the site of a compound fracture without further progress of the disease occurring. The stump end is wide open, affording ideal drainage. The medullary canal of the bone

end early becomes sealed by the formation of internal callus and the bone becomes covered by granulation tissue.

The closed method of amputation is not believed to have any place in the treatment of battle casualties or in amputation for the control of infection. In late primary amputations, and always in the delayed, infection too often is already established in the lymphatic glands above the lesion, and primary closure is done with great hazard.

THE REPAIR OF THE GUILLOTINE STUMP

The flapless guillotine method is a two stage amputation. This really should not be a cause for its rejection, because the repair of the properly treated guillotine stump is ordinarily a minor procedure.

PLASTIC CLOSURE

In the healing of the stump, the muscle and fascia have become fixed to the stump end, and the closure of muscle and fascia is not necessary as in a primary amputation. The scar tissue at the stump end is excised *en masse* through healthy skin and dissected from the fascia and muscle to the bone. If the scar is adherent to the bone end, ⅛ inch of bone is excised by a saw. A plastic closure is then accomplished by undercutting the skin from the fascia, advantage being taken of its elasticity, and the suture line is allowed to fall where it will.

PLASTIC RESECTION

If skin traction has not been properly carried out after the primary amputation, the soft tissues will be retracted; the bone end may extend 3 to 4 inches beyond the retracted skin in a thigh stump. Further bone shortening is necessary for repair. The scar tissue is excised *en masse;* bone is resected sufficiently to permit a skin closure. The wound is closed as in the plastic closure.

Fig. 6.—The difficulty in treating a stump with diluted solution of sodium hypochlorite is in placing individual tubes in position and keeping them there. Carrel tubes may be prepared in proper length in advance, sutured to several thicknesses of gauze the size of the stump end, sterilized and be made available before amputation and for future dressings. (Amputations, Lewis's Practice of Surgery.[1])

REAMPUTATION

If the stump is too long, i. e. through the tarsus, lower third of the leg or at the wrist, a reamputation is indicated at Syme's level, the middle third of the leg or at the site of election in the forearm. If the stump is too short, i. e. the upper third of the leg or the upper third of the forearm, reamputation is indicated at the site of election in the thigh or arm. Here the classic primary closed flap method is used.

Secondary closure of the circular guillotine stump is a wasteful procedure, as further bone shortening will be required, since a closure of skin, fascia and muscle is necessary. The repair should be delayed until a plastic closure is possible, unless the stump is too long.

Before the guillotine stump is repaired, x-ray examination should show no infection or sequestration in the bone end, the granulation tissue should appear healthy, cultures should show the absence of streptococcic infection and the soft tissues should show an absence of inflammatory edema.

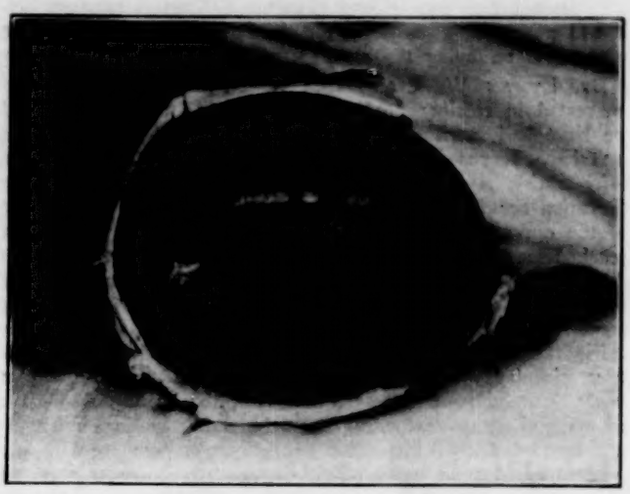

Fig. 7.—Same stump as in figure 5 ten days later. Clean granulation with no edema twenty-eight days after amputation. The wound will soon be ready for plastic closure. X-ray examination showed no abnormality of the bone.

Sulfanilamide or sulfathiazole should be used freely under the skin flaps before closure. With the use of these drugs it has already been shown that these stumps may safely be closed much earlier without fear of infection than during World War I.

SUMMARY

1. The circular or flapless guillotine method is the simplest, quickest and easiest method of amputation, conditions which are essential in a badly shocked or critically ill patient.

2. The patient becomes transportable earlier without the fear of the disastrous result of infection, which too often follows the closed method.

3. It exposes less soft tissue area and affords adequate draining of infected bone and the closed muscle fascia spaces of the extremity, thus limiting infection by adequate drainage.

4. It affords a stump of maximum bone length that survived the original injury.

Army General Hospital.

ABSTRACT OF DISCUSSION

DR. VERNON P. THOMPSON, Los Angeles: As a civilian without military experience, I am glad that, while taking care of my share of two thousand amputations the last fifteen years at the Los Angeles County Hospital, I had been a pupil of Dr. Philip Wilson and was aware of the importance of these essential principles which Dr. Kirk has laid down. We have all seen examples of the failure to preserve adequate soft tissue to cover bone in amputations. It is necessary to bear in mind precisely what type of patient Dr. Kirk has described and not confuse this problem with elective procedures or urgent amputations under good conditions. Even in these instances I prefer the stepped circular technic to flap procedures. The traction strips need to be applied properly close to the line of amputation, the circular strip not to be so tight as to act as a venous tourniquet, causing swelling and trouble in healing of the amputation stump. Once the skin and superficial fascia are distal to the bone end, the contraction of the maturing granulation tissue healing the amputation site is a material factor

in closing the wound. When the surgeon assists slightly in the retraction of each layer of skin, superficial fascia and muscle, a considerable number of the circular amputations at the knee level, cutting the femur close to a flare in the condyles, heal primarily with a small posterior scar without any secondary closure. Yesterday Dr. Wallis told us something about what happens to devitalized tissue, pointing out that even with such a clear, clean procedure as Colonel Kirk described it will not make up entirely for the lack of gentleness by the surgeon in removing the part.

Dr. Lyman W. Crossman, New York: We are much interested in refrigeration anesthesia for all amputations, and we have had startling success. I am sorry that Dr. Wilson isn't here, because we introduced it in his hospital. With the refrigeration anesthesia the patient has no shock during the operation or afterward, and they have no bleeding at the time of the operation. Because we use refrigeration, by means of cracked ice or by means of a refrigerator that can be run in the ambulance on the same generator that runs the electricity for the lights, we can keep down the swelling, and while we cannot overcome the infection, we can control it as long as the refrigeration is on. All our cases have been done by means of a circular incision on the oblique, so that when the part heals, if it happens to be a clean case, the healing shows the scar definitely posterior. We do have fulminating infections in a large municipal institution, probably, that compare with any war infection, and as a result of this particular technic we welcome the most fulminating of the infections.

Dr. Edwin W. Ryerson, Chicago: In the preceding war we were instructed to perform amputations according to the method of Bunge, detaching a narrow strip of periosteum from the end of the bone. Dr. Kirk now does not approve of this. There is a tendency at the present time among neurovascular surgeons to omit the injection of alcohol into the end of the nerve. I have performed many amputations using the alcohol injection and up to this time have seen no evidence of the formation of a painful neuroma. I believe that the alcohol injection should be made standard in the present war.

Dr. Norman T. Kirk, Washington, D. C.: Dr. Thompson and I are apparently in perfect agreement. The soft tissues need a bit of help in their retraction as each layer is cut through. I have had no experience with the refrigeration of extremities. This method of anesthesia, in certain selected cases, has been ideal, and Dr. Crossman is to be congratulated on his work. I doubt if this method will be applicable under war conditions. It might be used in late cases in the general hospital. Dr. Ryerson speaks of the removal of a cuff of periosteum. This is always done in the closed type amputation but never in the open method. If periosteum is removed when the guillotine amputation is performed, a ring sequestrum of the bone end invariably occurs. The normal periosteum covering the bone very definitely prevents infection therein. A long discussion might be entered into on osteoplastic methods. It was once thought that the uncovered bone in a stump caused a painful stump. Therefore certain osteoplastic procedures were evolved. The bone end was covered either with periosteum or with bone, examples being the Gritti-Stokes method. This, of course, was true, as Bunge demonstrated when he showed that the bone end, from which a cuff of periosteum was removed, produced a nonpainful stump.

Withering and Dehydration.—Old age has always been regarded as a period of withering and dehydration. The progressive loss of water is most conspicuous in those structures which are normally poorly vascular, such as cartilage and the lens of the eye. The tendency to water loss, however, is universal, and loss of intracellular protoplasmic fluids may be considered characteristic of senility. From this stems a trend to transform the condition of a sol to that of a gel, to condense the older tissues and to impair the ability of body fluids to keep substances in solution. This favors the precipitation of such substances as calcium salts, cholesterol and pigments.—Mueller-Deham, Albert, and Rabson, S. Milton: Internal Medicine in Old Age, Baltimore, Williams & Wilkins Company, 1942.

STUDIES ON METHODS OF PREVENTION OF EPIDEMIC INFLUENZA

JOSEPH STOKES Jr., M.D.
AND
WERNER HENLE, M.D.
PHILADELPHIA

The control of any epidemic respiratory disease in time of war, when aggregations of individuals are rapidly changing in both position and size, is a challenge to preventive medicine. For such a disease as epidemic influenza, in which possible methods of prevention during peacetime have been gaining a properly controlled momentum, the acceleration required by the war may well advance the consideration of preventive measures which, though evidence is not complete, have sufficient experimental success to warrant trial. Obviously, such trials should include only those measures which from previous experimental observations have the greatest possibility of success and which have at the same time no deleterious effect.

Despite the large group of respiratory infections of different etiology which resemble epidemic influenza, it has been possible since 1933 to identify widespread epidemics of influenza type A[1] with some degree of clarity. The virus of influenza type B has been more recently identified (in 1940) [2] and epidemics originating from it apparently have been small and scattered, although this may not continue to be true. In addition it has been possible in most of the epidemics of influenza A to predict the spread geographically to some extent. Moreover, epidemics of influenza A have followed alternate years with considerable regularity since 1933, occurring successively in 1935, 1937, 1939 and 1941. Such regularity of appearance and spread should be utilized in the consideration of preventive measures, combined with the realization that irregularities in sequence, spread and especially in etiology may increase in the future. Confusion concerning the etiology of certain epidemics of respiratory disease should not hinder active prophylactic measures against those which are to a great extent recognizable, and in the present critical period the adage may well be applied to epidemic influenza that often the most dangerous experiment of all is to do nothing.

The discussion of prophylactic measures against both influenza A and B may be divided into three main categories: (*a*) measures for the control of air borne infection, (*b*) vaccination procedures and (*c*) the use of immune serum.

MEASURES FOR THE CONTROL OF AIR BORNE INFECTION

It has been demonstrated experimentally that the virus of influenza A can be transmitted to animals by the air borne route,[3] and it is in all probability by this

From the Department of Pediatrics, University of Pennsylvania, School of Medicine, and the Children's Hospital of Philadelphia.

Read before the Section on Pediatrics at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1942.

1. Smith, Wilson; Andrewes, C. H., and Laidlaw, P. P.: A Virus Obtained from Influenza Patients, Lancet **2**: 66-68 (July 8) 1933. Francis, Thomas, Jr.: Transmission of Influenza by a Filtrable Virus, Science **80**: 457-459 (Nov. 16) 1934.

2. Francis, Thomas, Jr.: A New Type of Virus from Epidemic Influenza, Science **92**: 405-408, 1940. Magill, T. P.: A Virus from Cases of Influenza-like Upper Respiratory Infection, Proc. Soc. Exper. Biol. & Med. **45**: 162-164, 1940.

3. Trillat, A., and Beauvillain, A.: Assai de transmission aerienne de la grippe au furet par voie pulmonaire ou oculaire, Compt. rend. Acad. d. sc. **205**: 1186-1188, 1936. Andrewes, C. H., and Glover, R. E.: Spread of Infection from the Respiratory Tract of the Ferret: I. Transmission of Influenza A Virus, Brit. J. Exper. Path. **22**: 91-97, 1941.

route that the epidemic spread occurs. Methods for the disinfection of air are therefore important in any consideration of the control of epidemics.

Thus far, two important agents have been used experimentally in animals and man for such disinfection: (1) ultraviolet rays and (2) propylene glycol vapor.

Ultraviolet Irradiation of Air.—Although the bactericidal action of sunlight and ultraviolet light was known for many years, irradiation was not applied to the practical problems of air disinfection until rather recently in the work of Wells [4] and Hart.[5] Their studies were assisted considerably by the development of methods for determining quantitatively the contamination of the air by micro-organisms. In the course of such studies it has been found that air borne influenza virus type A can be destroyed by such irradiation,[6] and further that infection of mice with influenza A virus by the air borne route can be prevented by suitable irradiation of the inhaled air laden with virus.[7]

The Use of Propylene Glycol Vapor.—The usefulness of propylene glycol vapor for the disinfection of air was first fully recognized by Robertson and his associates,[8] although English workers [9] had noted the increased effectiveness of disinfecting aerosols such as hexylresorcinol when propylene glycol was used as a vehicle. This substance, like ultraviolet irradiation, was found to be highly effective in the prevention of the air borne transmission of influenza A virus to mice.[10]

In this pediatric clinic [11] experimental comparisons of these two methods for disinfection of air have been made in a large enclosed space which closely simulated field conditions. For this purpose a large infant ward was chosen at a time in the early fall when it was not needed for patients. The ward is approximately 47 feet by 27 feet by 11 feet and is divided as shown in figure 1 into sixteen cubicles open in front and separated from one another by walls reaching from the floor to within 4 feet of the ceiling. The arrangement for irradiation previously described [12] provided a curtain of ultraviolet light in front of each cubicle and a complete irradiation of the entire upper portion of the room above the tops of the cubicles. Propylene glycol was vaporized to a concentration in air of approximately 1 : 2,000,000 to 1 : 4,000,000 from an electric hot-plate placed in front of an electric fan in the position shown in figure 1. For both disinfecting agents as well as for the study of this space under control conditions the doors and windows remained closed, and highly mouse virulent suspensions (allantoic fluid) of influenza A virus were atomized into the air. Cages, each containing 10 mice, were placed on bed frames close to the back wall of the seven cubicles indicated in figure 1. The experiment consisted of three periods in which the virus was atomized, each of one hundred and fifty minutes. During the first period the ultraviolet light was tested, during the second period no agent was used for control and during the third period propylene glycol was vaporized. Between the second and third periods the ultraviolet lights were used to sterilize the air, and propylene glycol was vaporized for thirty minutes in order to insure a sufficient concentration of vapor before the exposure of the third group of mice.

Table 1 shows the results obtained in mice in the three periods described. It may be noted that all 70 of the control mice died within ten days from such exposure

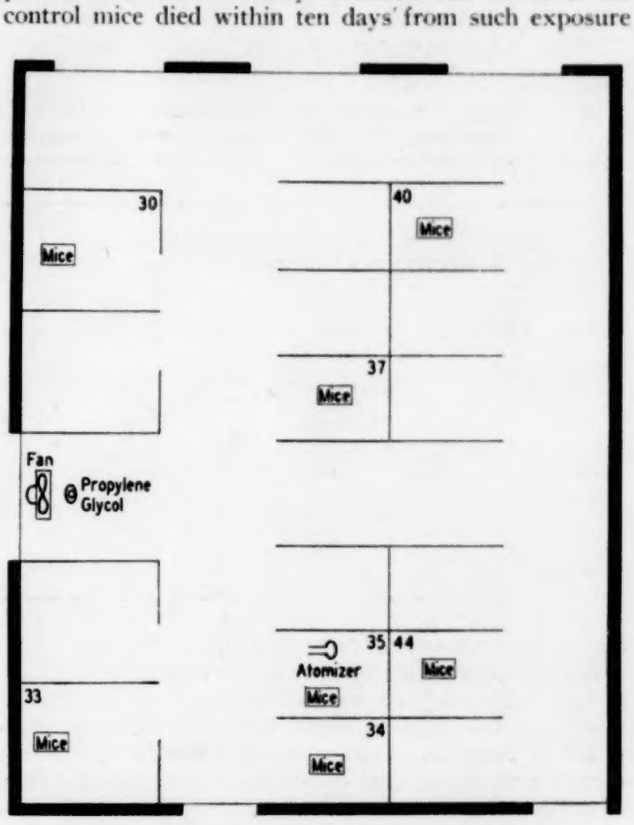

Fig. 1.—Floor plan of infants' ward.

with typical influenzal lesions, whereas with the ultraviolet light only 3 of the 70 mice died. All 3 of these were of the group placed in the cubicle containing the atomizer, while the other mice in the same cubicle at autopsy on the tenth day showed varying degrees of pulmonary consolidation. In the two cubicles adjacent to the atomizer, 12 additional mice at autopsy showed slight pulmonary involvement, while all the remaining mice had no lesions. On the other hand, when propylene glycol was used, all mice survived and only 3 animals in the cubicle containing the atomizer showed influenzal lesions at autopsy on the tenth day; none of the other mice showed any apparent signs of influenza. Three other mice died from noninfluenzal causes.

In summary of these experiments, it may be stated that ultraviolet irradiation and propylene glycol vapor in the proportions used were almost equally effective in preventing air borne infection of mice by influenza A virus.

4. Wells, W. F., and Wells, Mildred W.: Air Borne Infection, J. A. M. A. **107:** 1698-1703 (Nov. 21), 1805-1809 (Nov. 28) 1936.

5. Hart, Deryl: Sterilization of the Air in the Operating Room by Special Bactericidal Radiant Energy: Results of Its Use in Extrapleural Thoracoplasties, J. Thoracic Surg. **6:** 45-81, 1936.

6. Wells, W. F., and Brown, H. W.: Recovery of Influenza Virus Suspended in Air and Its Destruction by Ultraviolet Radiation, Am. J. Hyg. **24:** 407-413, 1936.

7. Wells, W. F., and Henle, Werner: Experimental Air Borne Disease: Quantitative Inoculation by Inhalation of Influenza Virus, Proc. Soc. Exper. Biol. & Med. **48:** 298-301, 1941.

8. Robertson, O. H.; Bigg, Edward; Miller, B. F., and Baker, Zelma: Sterilization of Air by Certain Glycols Employed as Aerosols, Science **93:** 213-214 (Feb. 28) 1941.

9. Andrewes, C. H.: Control of Air Borne Infection in Air Raid Shelters and Elsewhere, Lancet **2:** 770-774 (Dec. 21) 1940.

10. Henle, Werner, and Zellat, Joseph: Effect of Propylene Glycol Aerosol on Air Borne Virus of Influenza A, Proc. Soc. Exper. Biol. & Med. **48:** 544-547 (Nov.) 1941. Robertson, O. H.; Loosli, C. G.; Puck, T. T.; Bigg, Edward, and Miller, B. F.: The Protection of Mice Against Infection with Air Borne Influenza Virus by Means of Propylene Glycol Vapor, Science **94:** 612-613 (Dec. 26) 1941.

11. This experimental comparison was carried out in conjunction with Miss Harriet E. Sommer.

12. Wells, W. F.: Sanitary Ventilation in Wards, Heating & Ventilating **36:** 26-28, 1939.

The use of ultraviolet light in clinics and elsewhere has received many experimental trials, as reported by numerous investigators,[13] with encouraging results in many instances. On the other hand, the application of propylene glycol vapor has progressed little beyond the stage of animal experimentation. Here also, however, a small preliminary study starting Jan. 1, 1942 has given results suggestive of its value in the prevention of human respiratory infections other than influenza. This study was carried out by Dr. T. N. Harris[14] from this pediatric clinic in two comparable wards of 16 patients each in a convalescent home for children. The incidence of respiratory infections of all types in the two wards, under ordinary conditions, was approximately equal from Jan. 1, 1942 to Feb. 22, 1942 (15 and 16 cases respectively). Following the vaporization of propylene glycol, starting on Feb. 22, 1942 in the experimental ward in a concentration of approximately 1 : 30,000,000 to 1 : 40,000,000,[15] the incidence of respiratory infection over the period from Feb. 22 to April 18, 1942 in the experimental ward fell to a single questionable case and 1 case which occurred two days after onset of vaporization. The incidence in the control ward for this period, on the other hand, remained the same (16 cases). As soon as vaporization of the propylene glycol was discontinued, respiratory infections again returned to the experimental ward.

TABLE 1.—*Effect of Ultraviolet Light and Propylene Glycol Vapor on Air Borne Influenza Virus*

Cubicle Number	Mortality and Lesions in Mice		
	Control	Ultraviolet Light	Propylene Glycol Vapor
30	$D_7D_7D_7D_7D_8D_8D_8D_8D_9$	0000000000	000000000D_5 E
33	DDDDDDDDDD	2111111000	000000000D_7
34	$D_8D_7D_8D_8D_9D_9D_{10}D_{10}D_{10}$	2211100000	0000000000
35 (atomizer)	$D_8D_8D_8D_8D_8D_7D_8D_9D_9$	DDD3332211	3310000000
37	$D_8D_7D_7D_7D_7D_7D_7D_7D_8$	0000000000	0000000000
40	$D_7D_7D_7D_7D_7D_7D_8D_8D_9$	0000000000	000000000D_6
44	$D_7D_7D_7D_7D_7D_8D_8D_8D_9$ 6	0000000000	0000000000

D5, mouse died on fifth day.
1-3, degree of pulmonary consolidation on tenth day.
E, eaten, not examined post mortem.

TABLE 2.—*Result of Inhalation of Active Influenza Virus in Vaccinated and Control Groups*

Date of Vaccination	Vaccine (Allantoic Fluid)	Inhalation Weeks After Vaccination	Number of Individuals	Cases of Clinical Influenza	Per Cent
Dec. 1941	PR-8, WS, Melbourne	18	27	1	3
March 1942	PR-8	2	17	0	
Controls			28	10	35

13. McKhann, C. F.; Steeger, Adelbert, and Long, A. P.: Hospital Infections: I. A Survey of the Problem, Am. J. Dis. Child. **55**: 579-599 (March) 1938. del Mundo, Fé, and McKhann, C. F.: Effect of Ultraviolet Irradiation of Air on Incidence of Infections in an Infants' Hospital, ibid. **61**: 213-225 (Feb.) 1941. Wells, W. F.; Wells, Mildred W., and Wilder, T. S.: The Environmental Control of Epidemic Contagion: I. An Epidemiologic Study of Radiant Disinfection of Air in Day Schools, Am. J. Hyg. **35**: 97-121, 1942. Sauer, L. W.; Minsk, L. D., and Rosenstern, I.: Control of Cross Infections of the Respiratory Tract in a Nursery for Young Infants: A Preliminary Report, J. A. M. A. **118**: 1271-1274 (April 11) 1942.

14. Harris, T. N., and Stokes, Joseph, Jr.: To be published.

15. This concentration was determined by the method of Puck (Science **95**: 178 [Feb. 13] 1942) and was sufficient to reduce the number of air borne organisms in the ward very considerably.

VACCINATION PROCEDURES

Vaccination of human volunteers against influenza A was first attempted as early as 1935,[16] and the first results indicating the partial effectiveness of such a procedure in reducing the incidence of influenza A were reported from this laboratory.[17] Active virus from mouse lung suspensions and chick tissue cultures were used at first but were abandoned later in favor of somewhat safer [18] and more concentrated preparations. The high concentrations of virus in chick embryonic fluids were first observed with swine influenza virus [19] and were subsequently noted in human influenza A.[20] Studies on the vaccination of mice with such fluids gave excellent results,[21] and results of vaccination of human beings with such fluids were quite successful as far as the antibody response was concerned.[22] In this laboratory such fluids, inactivated by solution of formaldehyde, have been used extensively for studies on vaccination during the past winter in two state colonies in New Jersey.[23] Three groups of approximately 100 individuals each were vaccinated either by a single intramuscular injection (3 cc. of a mixture of strains PR-8, WS and of Melbourne influenza A) or by three such doses at weekly intervals or one intramuscular injection and two inhalations of inactivated vaccine a week apart. In other smaller groups, mixtures of the PR-8 strain of influenza A and the Lee strain of B were used, or either one alone. A satisfactory antibody response was noted in all groups as measured by the technic of Hirst (inhibition of chick red cell agglutination) and the results were closely comparable to those reported by his group.[24] There was no difference in antibody response in the groups treated by single or multiple injections.

A more critical test of the protective value of this inactivated allantoic fluid vaccine was then conducted in a single cottage housing 72 boys, namely 44 vaccinated and 28 unvaccinated controls. The 44 boys had been vaccinated partly in December (PR-8, WS, Melbourne) 1941 and partly in March 1942 (PR-8 only). In April 1942 all individuals were permitted for four minutes to inhale through aviation oxygen masks atomized allantoic fluid (approximately 0.4 cc. each) containing a strain of influenza A virus (F-99) freshly isolated from an infant which died with an overwhelm-

16. Francis, Thomas, Jr., and Magill, T. P.: The Antibody Response of Human Subjects Vaccinated with the Virus of Human Influenza, J. Exper. Med. **65**: 251-259, 1937.

17. Stokes, Joseph, Jr.; Chenoweth, A. D.; Waltz, A. D.; Gladen, R. G., and Shaw, D. R.: Results of Immunization by Means of Active Virus of Human Influenza, J. Clin. Investigation **16**: 237-243, 1937. Stokes, Joseph, Jr.; McGuinness, A. C.; Langner, P. H., and Shaw, D. R.: Vaccination Against Epidemic Influenza with Active Virus of Human Influenza: A Two Year Study, Am. J. M. Sc. **194**: 757-768, 1937.

18. Horsfall, F. L., Jr.; Lennette, E. H.; Rickard, E. R., and Hirst, G. K.: Studies on the Efficacy of a Complex Vaccine Against Influenza A, Pub. Health Rep. **56**: 1863-1875, 1941. Brown, J. W.; Eaton, M. D.; Meiklejohn, Gordon; Lagen, J. B., and Kerr, W. J.: An Epidemic of Influenza: Results of Prophylactic Inoculation of a Complex Influenza A-Distemper Vaccine, J. Clin. Investigation **20**: 663-669 (Nov.) 1941.

19. Scott, J. P.: Studies on Swine Influenza Virus, Vet. Ext. Quart. **1**: 19 (June) 1941.

20. Burnet, F. M.: Influenza Virus Infections of Chick Embryo by Amniotic Route: General Character of Infections, Australian J. Exper. Biol. & M. Sc. **18**: 353-360, 1940. Henle, Werner, and Chambers, L. A.: The Serological Activity of Extraembryonic Fluids of Chick Infected with Virus of Influenza A, Proc. Soc. Exper. Biol. & Med. **46**: 713-717, 1941. Nigg, Clara; Wilson, Doris E., and Crowley, J. H.: Studies on the Cultivation of Influenza Virus, Am. J. Hyg. **34**: 138-147 (Nov.) 1941.

21. Chambers, L. A., and Henle, Werner: Precipitation of Active Influenza A Virus from Extraembryonic Fluids by Protamine, Proc. Soc. Exper. Biol. & Med. **48**: 481-483, 1941.

22. Eaton, M. D.; Martin, W. P., and the personnel of Naval Laboratory Research Unit 1: Immunization with Inactive Virus of Influenza B: Comparison of Antibody Response with That Produced by Infection, Pub. Health Rep. **57**: 445-451, 1942.

23. These studies were carried out in cooperation with Dr. Gertrude Henle.

24. Hirst, G. K.; Rickard, E. R.; Whitman, Loring, and Horsfall, F. L., Jr.: Antibody Response of Human Beings Following Vaccination with Influenza Viruses, J. Exper. Med. **75**: 495-511 (May) 1942.

ing influenzal infection early in 1941. Table 2 shows the striking incidence of clinical influenza in the control group as compared to the single case in the vaccinated group, despite the greater number of individuals in the vaccinated group. There existed an inverse relationship between the amount of serum antibodies and the incidence of clinical influenza in these groups. It should be noted that the single case of clinical influenza in the vaccinated group had shown little, if any, response to the vaccine, showing very few antibodies in the blood serum immediately before inhalation of the active virus F-99. This inverse relationship was demonstrated originally by Smorodintseff and his co-workers and others,[25] as were also the clinical course of experimental influenza in human beings and the alterations in the total and differential white cell counts, although none of the volunteers in the previous studies had been vaccinated. A sulfonamide drug was administered in the present study to all patients with clinical influenza for protection against secondary bacterial complications, of which there were none. Figure 2 indicates the febrile course and white cell changes in 1 of the typical cases of influenza. The diagnosis of clinical influenza was made in all cases in which the temperatures were over 100 F. and the clinical signs and symptoms justified such a criterion. Flushing of the face, malaise, dryness and redness of the throat, aching of the back, arms and legs and dry cough were the outstanding signs and symptoms. There was little nasal discharge, no hoarseness, and rales were usually absent from the chest. The virus was reisolated in a number of cases on the second or third day after the inhalation, and all cases showed pronounced rises in neutralizing and complement fixing antibodies to the PR-8 strain of influenza A. The illness, as shown, was short and not severely disabling, nor was the convalescence a long one.

Although clinical influenza was, on the whole, absent from the vaccinated group, subclinical infection undoubtedly occurred, since a high percentage of boys in the two groups showed temperatures of 99 F. or over dur-

TABLE 3.—*Relative Amounts of Immune Serum Necessary for Protection by the Intravenous and Intranasal Routes Against 100 Minimum Lethal Doses of Influenza A Virus*

Virus	Mouse Serum	Serum Dilution	Amount and Route	Mouse Number 1	2	3	4	5	6	7	8
W. S. 6 hours after serum	Anti-W. S.	Not diluted	Intravenous 0.5 ML	0	0	0	0	0	0	0	0
		1:2		1	1	1	0	0	0	0	0
		1:10		D_8	D_9	D_{10}	D_{10}	3	3	0	0
		1:20		D_3	D_7	D_{10}	D_{10}	4	3	3	0
Same	Normal	Not diluted	"	D_3	D_3	D_4	D_4	D_4	D_5	D_7	D_7
Same	Anti-W. S.	Not diluted	Intranasal 0.05 ML	1	0	0	0	0	0	0	0
		1:2		D_7	D_{10}	2	1	0	0	0	0
		1:10		D_5	D_8	D_7	2	2	0	0	0
		1:20		D_4	D_4	D_8	D_9	D_9	D_{10}	1	0
Same	Normal	Not diluted	"	K*	D_4	D_4	D_5	D_5	D_7	D_9	4

* K=killed by ether anesthesia.

ing the week of the experiment, particularly on the second and fourth days after inhalation of the active virus. The subclinical infections, as indicated in general by the term, were selected only by the criterion of a temperature between 99 and 100 F. A large number of leukopenias were noted in the vaccinated group as well as in the control individuals, but it was noted that a significantly larger number of leukopenias occurred in the latter. The leukopenias were not necessarily related to temperature or titer of antibodies before inhalation. No other signs were noted in these groups, and the boys felt well.

This investigation, favorable as it is to the value of vaccination against influenza virus A, should lend

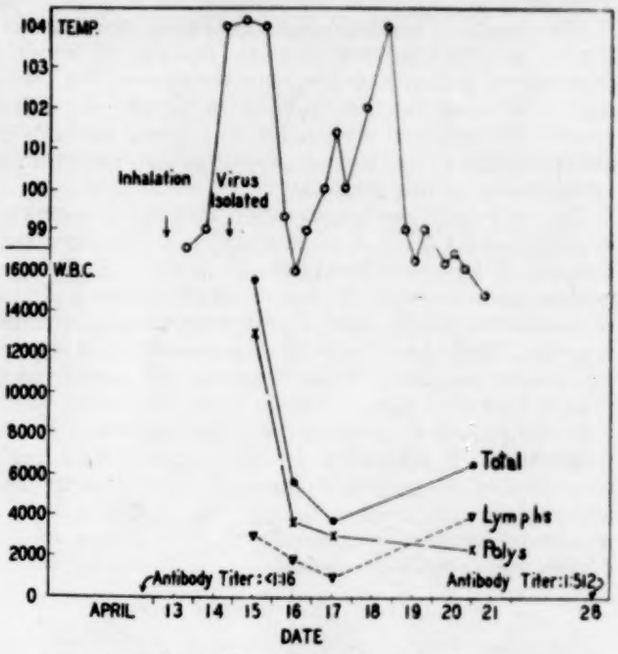

Fig. 2.—Influenza following inhalation of active virus.

encouragement to the further study of widespread vaccination under war conditions. It is possible that the partial protection afforded in the past against influenza A by various vaccines may be improved by the use of the more highly concentrated virus obtainable from the egg fluid, as utilized in these experiments.

Although no clinical trials under epidemic conditions have been as yet possible with influenza virus type B, studies conducted on mice and on human beings in this laboratory are confirmatory of those reported by Eaton and his co-workers, namely that pronounced rises in antibodies occur following vaccination with the inactive virus of influenza B. A combination of a concentrated virus vaccine containing both viruses A and B is now being used here and elsewhere in studies concerning their protective value.

THE USE OF IMMUNE SERUM

The use of serum containing large amounts of immune bodies against influenza virus A for passive immunization by means of inhalation was first reported by Stokes and Shaw,[26] and later by Smorodintseff [27] and others, who also mentioned briefly the experimental use of such serum in the treatment of influenza A. Later, more extensive studies [28] have fully confirmed the value of

25. Smorodintseff, A. A.; Tushinsky, M. D.; Drobyshevskaya, A. I.; Korovin, A. A., and Osetroff, A. I.: Investigation on Volunteers Infected with the Influenza Virus, Am. J. M. Sc. **194**: 159-170, 1937. Burnet, F. M., and Foley, M.: Results of Intranasal Inoculation of Modified and Unmodified Influenza Virus Strains in Human Volunteers, M. J. Australia **2**: 655-659 (Dec. 21) 1940.

26. Stokes, Joseph, Jr., and Shaw, Dorothy R.: Production of Passive Immunity Against Influenza Virus by Introducing Immune Serums into the Respiratory Tract, Am. J. Dis. Child. **58**: 653-654 (Sept.) 1939.

27. Smorodintseff, A.: Experimental and Clinical Investigation of the Specific Prophylaxis and Therapy of Influenza by Inhalation of Immune Serum, Proc. Third Internat. Congr. Microbiol., New York, 1940, p. 375.

28. Henle, Werner; Stokes, Joseph, Jr., and Shaw, Dorothy R.: Passive Immunization of Mice Against Human Influenza Virus by the Intranasal Route, J. Immunol. **40**: 201-212, 1941. Zellat, Joseph, and Henle, Werner: Further Studies in Passive Protection Against the Virus of Influenza by the Intranasal Route, J. Immunol. **42**: 239-249, 1941. Taylor, R. M.: Passive Immunization Against Experimental Infection of Mice with Influenza A Virus: Comparative Effect of Immune Serum Administered Intranasally and Intra-Abdominally, J. Immunol. **41**: 453-462, 1941.

such immune serum for passive immunization of mice by inhalation and also for use in mice even twenty-four to forty-eight hours after the intranasal inoculation of the virus. Such a study is shown in table 3 and indicates the relatively small amounts of immune serum required for protection of the mice when serum is inhaled as compared to the amount required by the intravenous or intraperitoneal route for the same degree of protection.

The results of such passive immunization by inhalation in ferrets have not been as striking, although a pronounced decrease in lung involvement of the ferret can be effected by this method of inhalation. From recent experience it is probable that better methods of atomizing the serum and of inhalation may increase the effectiveness of this method.

The collection and preservation of large amounts of immune serum from convalescent or from vaccinated individuals has been of assistance in the experimental trial of such methods of passive immunization and also of treatment under natural field conditions. In this regard, studies have recently been carried out in this laboratory on the globulin fractions of pooled adult plasma furnished by Dr. Edwin Cohn, according to his method of plasma fractionation. The concentration and preparation of antibodies by this method should aid considerably in passive immunization of animals and also possibly of human beings and should aid in a similar experimental approach to the therapy of the disease under field conditions.

SUMMARY AND CONCLUSIONS

Experimental evidence was obtained concerning three promising approaches to the control of epidemic influenza and in particular influenza A, namely (1) by disinfecting within enclosed spaces the vehicle, air, through which cross infections probably occur, (2) by actively immunizing susceptibles and (3) by passively immunizing exposed susceptibles with immune serum.

1. Studies were made concerning the comparative merits of ultraviolet light and propylene glycol vapor for disinfecting the air of influenza A virus and concerning the possible protection of individuals from cross respiratory infections by means of propylene glycol vapor.

2. A group of boys vaccinated against influenza A virus and a group of suitable controls were exposed to a recently isolated active influenza A virus by inhalation. Striking protection was afforded by the vaccine.

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ABSTRACT OF DISCUSSION

DR. ALBERT B. SABIN, Cincinnati: It is a very difficult task even to attempt to substitute for Dr. Trask, who was scheduled to open the discussion and whose loss is felt not only by all of you but by many others in many related fields. The work presented this morning by Drs. Stokes and Henle shows that a number of hopeful procedures are available for trial during an epidemic of influenza. The experimental work of Drs. Stokes and Henle differs from that of many other investigators of influenza in that it is not limited to mice. Theirs is truly a story of mice and men. It is amazing the way Dr. Stokes manages to carry out experiments under excellently controlled conditions in human beings, in a way that gives us information that could hardly be obtained in the field during an epidemic. If he told us nothing more this morning than the story of that excellent experiment on some 70-odd individuals who were divided into vaccinated and nonvaccinated groups and then artificially infected with the virus under carefully controlled conditions, it would indeed be a landmark in the work on influenza. He probably could have spent a great deal more time describing the syndrome resulting from experimental infection of human beings with influenza virus. The evidence presented leaves little doubt that very striking protection can be obtained against one type of influenza virus by vaccination at the appropriate time. To be sure, the great difficulty is that in epidemics of influenza the incidence of various immunologic types of the virus is unpredictable and the total number of cases that may be prevented by vaccination against one or even two types of the virus may by itself perhaps not stop the course of the epidemic. However, particularly during times of war, the protection of even 30 or 40 per cent of a large population against influenza would be a distinctly worthwhile accomplishment. The evidence that ultraviolet radiation and propylene glycol may be expected to destroy some of the virus in barracks or in other crowded places, that vaccination may protect some if not all, and, finally, the experiments on animals indicating that the insufflation or nasal instillation of anti-influenzal serum may also protect all lead to the realization that tools are available for the attempt to modify the course of an influenza epidemic.

DR. E. C. ROSENOW, Rochester, Minn.: I wish to compliment Drs. Stokes and Henle on their excellent work, especially on the emphasis which they place on the need for preventing air borne infection. In order to emphasize the importance of air borne infection in influenza and other epidemic diseases and the reason for their occurrence, may I state briefly the results of certain bacteriologic studies made of indoor and outdoor air by special methods with which we have isolated consistently pneumotropic types of streptococci from, and have demonstrated influenza streptococcus antigen by the precipitation reaction in washings of air of rooms occupied by persons having influenza and other respiratory infections and during epidemics from washings of outdoor air and from rain. Recently this streptococcus has been isolated from and the antigen demonstrated in newly fallen snow, after a prolonged spell of dry, cold, clear weather. This snowfall occurred on Feb. 8, 1942 at the outset of an epidemic of influenza. The streptococcus was isolated from four widely separated samplings, including two in the country far removed from human habitation. It had extreme pneumotropic virulence, producing hemorrhagic edema and bronchopneumonia on intracerebral inoculation of rabbits of extremely small doses and on intranasal inoculation in mice. This was true of the primary culture and of cultures far removed from the original source. Interestingly, emulsions and filtrates of the pneumonic lungs of mice that had been inoculated with cultures of the streptococcus far removed from the original source produced bronchopneumonia in mice on intranasal inoculation. This virus derived from the streptococcus was then passed successively in series on intranasal inoculation through fifteen mouse passages. Cultures from the pneumonic lungs were usually negative, but the streptococcus identical morphologically and antigenically to the streptococcus isolated from the snow was isolated in cycles of from three to nine mouse passages. This and other similar experiences suggest strongly a relationship between the streptococcus-pneumonococcus group of organisms so commonly at hand in pandemic, epidemic and endemic influenza and the virus of influenza. Attempts to isolate pneumotropic or influenza virus from the snow proved unsuccessful. The general presence, for reasons still obscure, of certain specifically virulent streptococci and streptococcus antigen characteristic of epidemics is believed to be of epidemiologic importance and needs to be considered in their control. Specific, active immunization, in advance of or abreast with epidemics, with appropriate vaccines or antigens is specially indicated.

DR. JOSEPH STOKES JR., Philadelphia: We appreciate Dr. Sabin's remarks and agree thoroughly with him that there are difficult problems in epidemic influenza as far as the etiology of the epidemics is concerned. Simple methods such as the inhibition of red cell agglutination as developed by Hirst for the determination of neutralizing antibodies should assist considerably in the analysis of epidemics of influenza and the effect of vaccination. A proper comparison of various results on vaccination cannot be made unless one knows the type and strength of vaccine, the method of vaccination and the length of time after vaccination that the epidemic occurs.

WHAT CAUSES FLATULENCE?

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Flatulence is one of the commonest symptoms complained of by patients with indigestion or what they think is indigestion. Unfortunately, in many cases the cause cannot be determined. The first thing the physician must do when a patient complains of gas is to find out what he means. Does he mean that he is belching, does he bloat, does he feel as if gas was trapped in a segment of intestine or does he pass excessive amounts of flatus? Curiously a patient may have any or all of these troubles and still not have real flatulent indigestion! The chronic belcher is swallowing air because he is nervous or frightened; the woman who bloats may have only an angioneurotic edema of her bowel; the man who feels as if he had gas in his stomach may have only a duodenal ulcer or constipation, and the man who is passing much flatus may only be chewing gum and swallowing much air with the saliva.

THE PATHOLOGIC PHYSIOLOGY OF FLATULENCE

Before taking up the clinical aspects of flatulence, I will speak briefly of the mechanisms by which gas gets into and out of the bowel. Contrary to the common impression, most of the gas is probably not formed through fermentation in the bowel. Analyses have shown that most of it is nitrogen left from swallowed air. Some persons swallow much air, but just why, no one knows. Perhaps when they swallow fluids they do not close their lips over the glass, or in them the muscles of the tongue and nasopharynx behave peculiarly. Every one, of course, swallows some air with "raised" breadstuffs. Because nitrogen is not easily absorbed from the bowel, nearly all of that which is swallowed in air must go on through to the rectum to be extruded as flatus.

Often, when a person feels that he is distended with gas, roentgenologic examination of the abdomen would show that he is mistaken. In adults there is usually little gas to be seen in the small bowel. What gas there is in the abdomen is generally in the colon. This may be due to the greater ability of the small bowel either to absorb gases or to pass them on rapidly. Some of the gas in the intestine is apparently excreted from the blood. Under the influence of emotion, such excretion can take place with surprising rapidity.

Flatus does not contain much carbon dioxide or oxygen, because these gases are easily and rapidly absorbed by the bowel and thrown out through the lungs. In herbivorous animals large amounts of gas are constantly being taken up by the blood as it passes through the walls of the stomach and cecum. Obviously, any condition that interferes with the return of venous blood from the intestine is likely to produce gaseous distention. Pneumonia, which interferes with the passage of gases from the lung, can also produce intestinal distention. As Fine has shown, when a man with a bloated abdomen is made to breathe pure oxygen, there is such a steepening of the gradient in nitrogen tension from the intestine through the blood to the alveoli of the lungs that the gas rapidly leaves the distended bowel.

Swallowed air usually is passed through a normal bowel easily and rapidly and painlessly, but gas resulting from the eating of some food to which the patient is allergically sensitive seems often to remain trapped for hours in segments of bowel which are tonically and painfully contracted. Relief comes only when perhaps, with the taking of food, waves again start traveling down the bowel. When the Emperor Claudius, who suffered from flatulence, published an edict that no Roman need feel reticent about passing flatus in public, one of his waggish courtiers suggested that while he was at it he should have passed another law to enable every Roman to pass gas whenever it was distressing him!

From the Division of Medicine, Mayo Clinic.
Read before the Section on Miscellaneous Topics, Sessions on General Practice, at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1942.

BELCHING

An ordinary single "burp" is due usually to a reverse wave coming up the esophagus from an overfull stomach, but repeated belching is due always to the swallowing of air. This goes down as far as the cardia and is then returned. Roentgenologic studies show that only occasionally is some of it forced into the stomach. When a man belches repeatedly in this way, it is usually because he is trying to relieve a feeling of distress about the cardia, which I am sure is due often to the running backward of waves on the stomach. He may keep on belching for ten minutes or more, hoping that eventually he will get up one huge belch which will delight him and put an end to his distress. This big belch can be gotten sometimes by drinking a little sodium bicarbonate in water. I think what happens then is that the reverse waves stop running, and the man feels relieved just as he would if an attack of auricular fibrillation was suddenly to stop.

It isn't enough to tell a patient that he is swallowing air and should stop it. To be sure, an intelligent and strong willed person, when he is convinced that he is, in a way, just scratching himself with air and developing a useless and unpleasant habit, will usually stop. But even then the physician should go ahead to find out why the man got to swallowing air. Sometimes it is just a nervous habit, like a tic or the cracking of knuckles which some ignorant persons indulge in when nervous and ill at ease. Many persons belch because they are so terribly on edge, with the knee jerks exaggerated. Others start belching when they are frightened, perhaps by a feeling that the heart is failing or that some indefinable disaster is impending. Business men may belch at night when they are under great strain and fearful that they are going to crack up nervously.

Many men and women wake in the night frightened, perhaps by an extrasystole, and this starts them to belching. In such cases the main factors are jitteriness and fear of heart trouble, and no treatment can succeed until the patient is reassured. In other cases, and especially with elderly men, the heart is actually failing under the influence of hypertension or coronary disease, and this is what is producing the distress around the cardia. In a few cases the gas that the man is trying to get rid of is in the splenic flexure of the colon. Naturally, then, it cannot be gotten up, no matter how long the man belches. Not infrequently the disease at fault is in the gallbladder.

Occasionally one finds a particularly expert and noisy belcher who is a near relative of the insane, and his attacks are then due to sudden panicky spells, due perhaps to a fear that he is losing his reason.

BLOATING

When a woman bloats, much can be learned about the cause by questioning her. Has she noticed that the distention follows the eating of any particular foods

or does it follow excitement or strain or fatigue? How does the swelling go down? Is gas passed then or isn't it? If no gas is passed, then the bloating is likely to be of the type that is due perhaps to angioneurotic edema of the intestine or an abnormal concentration of blood in the abdomen. In these cases roentgenologic studies show that it is not due to gas in the bowel. Usually this type of bloating is found in a nervous woman who is crossed in love. The swelling increases during the day and generally goes down during the night. With it there may or may not be discomfort, indigestion or constipation. Naturally, in such cases enemas and carminatives do not help. A patient with true bloating due to gas will get relief as soon as the gas is passed.

Curiously, some persons bloat suddenly the minute they drink a glass of water or put any ice cold fluid into an empty stomach. In these cases it would seem that there must be some reflex disturbance which causes gas to pour from the blood into the bowel.

A FALSE FEELING OF FLATUS

A few patients with duodenal ulcer and many with "pseudo ulcer" will complain not of hunger pain but of a feeling of gaseous distention, which is usually relieved shortly after the taking of food. What happens probably is that the food causes gas to move on out of some segment of the bowel. It starts waves going normally down the intestine. Constipation is a common cause of such distress because the plug in the rectum tends to hold back the waves which would otherwise move the gas onward.

EXCESSIVE FLATUS

Persons with an excessive amount of flatus must be swallowing much air or else they are suffering with much intestinal fermentation or with some breakdown in or reversal of the mechanism by which the blood normally carries gases out of the bowel. In disease these gases can be excreted from the blood into the bowel. Flatus which has no odor is likely to consist of air, while that which is foul is likely to be produced through the fermentation of food. A bad odor can, however, be picked up by the gas as it is churned with feces and particularly with liquid feces. Particularly foul flatus is due sometimes to the eating of some food to which the patient is allergic.

CONSTIPATION

Probably one of the commonest causes of flatulence is constipation. The physician should always ask whether the flatulence disappears when the bowels get to moving normally. It helps diagnostically to have the patient take an enema of a quart of isotonic solution of sodium chloride every day for a few days to see if this works a cure. In some persons the taking of laxatives of any kind will produce flatulence. In case the colon is sensitive, even a small mass of fecal material in the rectum may for hours cause gas to keep forming. That the mechanism at fault is a nervous one is indicated by the fact that the minute the fecal mass is expelled the gas will stop forming.

THE EATING OF CERTAIN FOODS

As Hippocrates noted ages ago, and as the peoples of Europe have discovered during the two world wars, a rough diet can be flatulent and windy. There are many persons with a sensitive bowel who cannot handle much roughage. As this irritates the mucosa, it perhaps interferes with the normal passage of gas out of the bowel, or its presence interferes with the digestion and absorption of carbohydrates. As every one knows, some foods, such as dried beans and cooked cabbage, are particularly likely to produce flatulence. Evidently they contain some chemical substance which irritates the mucosa of the bowel and interferes with the passage of gas through it and into the blood.

Curiously, on questioning 500 patients as to the foods that actually gave them gaseous distress, Hinshaw and I found that most of the persons complained of onions. Next, in order of frequency, the foods most commonly blamed were cooked cabbage, raw apples, radishes, dried beans, cucumbers, milk, fatty or rich foods, melons, cauliflower, chocolate, coffee, lettuce, peanuts, eggs, oranges, tomatoes and strawberries.

FOOD ALLERGY

Probably more commonly than physicians suspect today, flatulence is due to the eating of some food or foods to which the patient is allergically sensitive. The result often is abdominal distention and crampy pain. The important point to remember is that some of the worst gas producers are not the notoriously indigestible foods but those such as milk and eggs, which have a fine reputation in the sickroom. Actually, any food can be the offender, and it can be identified and incriminated only with the help of some detective work. Sometimes the patient can discover it by keeping a record of unusual foods eaten a few hours before the bloating appears. Occasionally, some drink such as rum will irritate a sensitive colon and cause flatulence.

OVEREATING

Commonly, an attack of flatulence follows the eating of so much food that the bowel becomes overwhelmed and cannot handle it all. Then some of it ferments and decomposes, and the bowel fills with gas.

ANXIETY OR PAIN

In some persons gas appears rapidly in the bowel under the influence of pain, fear or excitement. Dr. Stafford Warren once pointed out to me that the first film made of a sensitive patient just before he submits to the passage of ureteral catheters usually shows but little gas, whereas the second film, made after the catheters are in place, often shows the small bowel filled with gas.

CHOLECYSTITIS

A common cause of flatulence or bloating or a feeling of flatulence, especially in stout women past middle age, is cholecystitis. Just what the mechanism is which produces the distress is not known. In these cases it often helps if the patient eats less and particularly if she eats a light supper.

COLDS

Some persons with a sensitive bowel suffer from gas when they are coming down with a cold. The virus appears to work some injury to the bowel because often the worst part of the intestinal upset comes during the prodromal period, when as yet there is no disturbance in the nose, throat or lung. Perhaps some mucosal change appears in the bowel before it appears in the nose and throat.

DIARRHEA

Many persons with diarrhea are plagued by flatulence, which may be due to a defect in the absorptive functions of the mucosa of the small bowel, related to that which has led to a decrease in the absorption of water and residues from the digestion of foods. Per-

haps also the cause of the diarrhea interferes with the mechanism that causes gas to pass through the mucosa and into the blood vessels of the intestine.

A SENSITIVE COLON

Many patients with a sensitive, mucus forming type of colon suffer with gas. This may form when the patient goes out to dinner or to the theater, or perhaps when he entertains in his home. The trouble seems to be due partly to excitement and partly to a vicious circle which starts when a little gas forms and cannot, for reasons of politeness, be passed immediately. The distention of the rectum then causes more gas to be formed until the patient is in misery. That the trouble is due to nervous influences is suggested also by the fact that in some persons it can be blocked by the taking of a little paregoric or codeine.

HEMORRHOIDS

In some few persons flatulence appears to be due to the presence of irritated hemorrhoids or an inflamed and infected anal ring. The irritation around this ring seems to cause backpressure in the left side of the colon, and this causes gas to accumulate in the splenic flexure. Patients with a large amount of gas in the splenic flexure can secure some relief by getting into the knee-shoulder position or by hanging over the side of the bed so that the gas can rise up into the rectum and from there be expelled.

MILD INTESTINAL OBSTRUCTION

Whenever an older person who has never suffered with flatulence begins to note loud borborygmus, he should immediately have the bowel studied by a good roentgenologist and proctologist. I have seen a number of cases in which borborygmus was the first sign of the development of an obstruction due to a carcinoma of the bowel.

A FAILING HEART

As I have already remarked, especially in older men who have previously been well, the coming of flatulence after exercise, and particularly when the person walks after eating a meal, should make the physician think of a failing heart with some passive congestion in the bowel.

MILD CYCLIC INSANITY

Every so often a woman who comes complaining of gas is found to have a cyclothymic type of personality which causes her to be for a while too energetic and active and then for a while depressed, discouraged, irritable and tired out. She suffers with flatulence during the periods of depression.

INTESTINAL PARASITES

Since one of the possible causes of flatulence is infection of the bowel with parasites such as Giardia or amebas, in all puzzling cases of excessive flatus the stools should be examined by an expert.

TREATMENT

From what has gone before, it will be obvious that no one should ever attempt to treat flatulence without first finding out that the patient really has an extra amount of gas in his bowel. If actually there is some indigestion or an abnormal amount of gas present, the next thing to do is to get some idea as to why it is there.

If the flatulence seems to be due to the eating of some irritating food, an effort should be made with the help of a food diary or an elimination diet to find out what it is. The elimination of roughage, raw foods and some of the notoriously gas forming foods and laxatives may help, or the patient may get relief simply by cutting down on the amount of food eaten. The relief of constipation by enemas may give great relief.

Some of the persons who want to belch because they feel that they have gas in the stomach are helped by taking sodium bicarbonate, perhaps with some aromatic carminative added. It is hard to say how much good carminatives do or how they act. Alcohol sometimes works well and peppermint is probably helpful. In bad cases a teaspoon of camphorated tincture of opium often works best. Walking about is sometimes helpful because it starts the gas to moving down the bowel. Often the sipping of water or a little milk, or the taking of a little food will help by starting waves running down the intestine. When the gas starts to move out of the segment of intestine in which it has been trapped, the pain goes. When the gas is in the colon, relief can usually be obtained by the taking of an enema. Even when the gas is in the small bowel, an enema may bring relief by removing a plug of feces which is keeping waves from moving caudad. In some cases a diseased gallbladder must be removed, and in others a failing heart must be rested.

A friend of mine used to cure belching women by asking them if they were accustomed to pass flatus loudly in public. When, shocked and outraged, they said "Of course not," he asked why then were they so often passing it noisily by mouth!

ABSTRACT OF DISCUSSION

DR. BURRILL B. CROHN, New York: One should differentiate the complaint of gas when enunciated by the patient and when elicited by the doctor. The patient who talks of gas may cover any combination or syndrome of symptoms representing organic disease or functional subjective phenomena. Patients never know exactly what they mean by gas. They have no concept of gas as gas. Gas to the patient represents a discomfort, a pain, a mild colic, an audible rumbling or just a sense of heaviness or distress. So, when the patient says gas, one begins looking for flatulence due to disease. Gas may mean the beginning of carcinoma. Gas may mean the beginning symptoms of ulcer. Gas may be the first symptom of myocardial breakdown or the beginning of an onset of coronary disease. The most striking instance was illustrated by a German past middle age who belonged to a very reputable social club, played pinochle to 2 o'clock in the morning, ate heavy sandwiches and drank beer after 12:30 p. m. and then insisted on walking for 40 or more blocks. This man complained continually of gas; coronary disease was suspected because most of the distress took place on exertion after meals. The man died in a taxicab; he had complained only of gas. What the doctor hears with his ears and what he recognizes as gas are different things. The passing of audible flatus may be caused by anything from a continuous dietary indiscretion to a partial obstruction of the colon or disease elsewhere in the alimentary tract. Gas in the upper abdominal tract indicates myocardial or coronary disease; gas in the lower abdomen represents disturbed intestinal function. Gas may be created by the overeating of one particular article of food or by overeating in general. The patients themselves should know to what article of food they are susceptible—cabbage in one group of patients, cauliflower in another, cucumbers in a third. Each individual has a peculiar susceptibility. For these idiosyncrasies and peculiarities there are no natural cures. Overeating in kind or overeating in bulk is the cause for most of the lower abdominal gas. The treatment for this type of gas is semistarvation. Put them on a low diet, small meals slowly eaten, take out milk, and most patients promptly lose gas. A patient with several abdominal scars in whom several surgeons have suspected and attempted to cure an "intestinal obstruction" should be suspected of hysteria and

adynamic ileus. The very sight of that huge abdomen should make one wary of surgery. This is another instance of the purest type of functional distention with gas.

Dr. Edward Weiss, Philadelphia: I want to make one remark concerning anxiety in relation to gas. I suggest that you tell your patients what is in effect the truth, that the abdomen is the sounding board of the emotions and that when they are upset tea and toast will give them gas, and when they are at peace with themselves they can eat hardtack and digest it.

Dr. Walter C. Alvarez, Rochester, Minn.: It is unfortunate that civilized man today has no intermediate words for certain bodily functions. As a result we are forced to use either the technical medical word unknown to the layman or the "dirty" one which he knows but is not supposed to utter in polite society. Those of you who may have read Casanova's Memoirs will remember that he once had an experience with a girl who, under sexual excitement, passed great quantities of gas. Being somewhat of an anthropologist, he wrote the case up. It is interesting that primitive man noticed the influence of emotions in producing borborygmus and flatulence. When I was a boy in Hawaii, the natives spoke of what we would call a big hearted man as "big bellied." The Australian savages have no word for sorrow except "bowels moving." When we turn to the King James version of the Bible we find the word bowels used where, in the revised version, the word heart is used.

SUBACUTE BACTERIAL ENDOCARDITIS

RECOVERY FOLLOWING INTRAVENOUS SODIUM SULFADIAZINE

GEORGE F. DICK, M.D.
CHICAGO

Although there have been a few reports of favorable results from the use of sulfonamides in endocarditis, my own experience with them has been discouraging.

While there have generally been some improvement in fever following the use of sulfanilamide, sulfathiozole and sulfadiazine and some decrease in the number of colonies in agar plate blood cultures, we have obtained no extended periods of negative blood cultures in a fairly large experience.

In many instances the improvement obtained at first was not maintained, suggesting that perhaps the streptococci over a period of weeks or months became resistant to the action of the drugs employed.

I have had no better results in endocarditis with sulfadiazine administered orally and given up to the limit of tolerance than with preceding sulfonamides, but it has seemed to me less toxic. It was, therefore, thought justifiable to try massive dosage of sodium sulfadiazine [1] intravenously with the hope that all the streptococci might be killed before any resistance to the drug was established.

Although the necessary danger of massive dosage is apparent, the fact that I have in a rather large experience had such discouraging results from treatment seemed to justify such a trial.

REPORT OF CASE

A. H., a man aged 30, came to the outpatient department at Billings Hospital on April 20, 1942 complaining of weakness, loss of 22 pounds (10 Kg.) in weight and the loss of appetite and nausea for a month and pain in the right shoulder for two days. One month previous to admission, the patient had an infection of the right hand after a piece of brass was driven into the hand. He was treated by the company physician and given sulfanilamide in wet dressings for six days. The hand improved, but the patient's general condition seemed to be worse. Sulfanilamide treatment was discontinued, and at that time the patient had a temperature of 100.4 F. He had since taken his temperature twice a day and had noted a variation from 98.4 to 102 F. The patient had not worked. On the Friday previous to admission he had severe chills. He also noted swelling of the ankles on one day the week before admission. Since the day before admission he noticed a sharp pain in the region of the right scapula. When he was first seen the blood pressure was 128 systolic and 75 diastolic and the temperature 100.2 F.

He was admitted to the medical service at Billings Hospital on April 21 for diagnosis. At that time there was noted a presystolic and a systolic murmur over the mitral area. Roentgenograms of the chest showed a moderately enlarged heart, with the lung fields clear. The blood count showed 10,500 white cells and 4,580,000 red cells; there was 13.5 Gm. of hemoglobin per hundred cubic centimeters. The urine showed a trace of albumin, an occasional red cell and also an occasional leukocyte.

A blood culture made on entrance showed an average of 51 colonies of Streptococcus viridans in each of the blood plates. Cultures in broth showed typical colonies of gram-positive streptococci forming long chains. Two days later a second blood culture showed an average of 41 colonies to the plate. On this day the patient was given 40 Gm. of sodium sulfadiazine intravenously in 500 cc. of water. About two hours after this injection the patient had some cramping abdominal pains, and half an hour later he vomited.

Whereas the urinary volume for the twenty-four hours preceding the injection was 1,065 cc., on the following day the urinary volume was only 215 cc. and the urine contained some gross blood. On the second day after the injection the total twenty-four hour volume of urine was 15 cc., and the daily volume continued as follows: April 26, 50 cc.; April 27, 25 cc.; April 28, 130 cc.; April 29, 375 cc.; April 30, 947 cc.; May 1, 1,400 cc. After this it continued normally.

Owing to the loss of fluid by emesis, the patient was given intravenous injections of 5 per cent dextrose in saline solutions to keep up his body fluids and electrolytes, and on April 27 he was also given sodium lactate intravenously to maintain a normal p_H. The blood levels of sulfadiazine and urea nitrogen during this period are shown in the accompanying table.

Levels of Sulfadiazine and Urea Nitrogen in the Blood

Date	Sulfadiazine		Blood Urea Nitrogen
	Free	Total	
4/23	89.0	90.0	.....
4/24	73.1	81.0	17.9
4/25	56.7	65.9	.....
4/26	45.9	70.9	35.9
4/27	37.4	66.9	44.6
4/28	32.8	60.1	44.8
4/29	28.0	56.5	73.1
4/30	23.7	47.7	86.2
5/ 1	15.6	39.5	93.7
5/ 3	3.1	9.0	71.4
5/ 5	0.5	1.1	49.3
5/11	11.9	13.0	7.3
5/13	12.2	13.0	4.9
5/15	12.4	13.2	6.4
5/17	39.9	.....	.....
5/18	20.2	.....	6.9
5/19	9.1	9.3	6.5
5/20	3.1	3.2	.....

A blood culture made April 26, three days after the intravenous injection of sodium sulfadiazine, was sterile, as were all subsequent blood cultures, made on May 1, 17 and 26.

The temperature following the injection of sodium sulfadiazine, which had previously varied between 98.6 and 100.4 F., fell to normal within a few hours, remained normal for five days and during the next six days varied from a maximum of 100.4 to a minimum of 98 F. After this period the temperature again returned to normal and has remained normal during the past month. On May 20 a slight diastolic murmur over the aortic valve was heard.

From the Frank Billings Clinic of the Department of Medicine, University of Chicago.

1. This drug was furnished by Lederle Laboratories, Inc., Pearl River, N. Y.

By May 5 the total sulfadiazine level in the blood had fallen to 1.1 mg. per hundred cubic centimeters. The blood urea nitrogen was normal on May 8, and the patient had a normal temperature and normal urine and felt well. Although the blood stream was sterile, it was decided to give more sodium sulfadiazine in order to insure, if possible, sterilization of the cardiac valves. Accordingly, beginning with 5 Gm., intravenous injections were given as follows: May 8, 5 Gm.; May 11, 8 Gm.; May 15, 10 Gm.; May 17, 14 Gm. This was followed by a total sulfadiazine blood level on May 17 of 39.9 mg. Since this date the patient has received no medication except for a hematinic elixir and a daily dose of digilanid 0.00033 Gm.

Six weeks after the drug was given, at the time of writing, the patient feels perfectly well and has had a normal temperature for a month. The sterility of the blood stream as indicated by blood cultures made during the past month probably indicates that his heart valves are free from living organisms and will remain so unless reinfection occurs.

SUMMARY

In a case of subacute bacterial endocarditis recovery from active bacterial infection followed the intravenous injection of 40 Gm. of sodium sulfadiazine. Somewhat alarming but transient renal damage occurred. There was no evidence of permanent injury to the kidneys.

Clinical Notes, Suggestions and New Instruments

PENTOSURIA AND DIABETES MELLITUS

ROBERT E. MOSS, M.D., AND BURNHAM S. WALKER, M.D.
BOSTON

Although recognized [1] in 1892, few cases of chronic essential pentosuria have been reported. Enklewitz and Lasker [2] in 1933 were able to find reports of 100 cases, to which they added 12. They pointed out, however, that the condition is not excessively rare if consistently looked for in all instances in which a small amount of reducing substances is found in the urine. Marble [1] reported in 1932 that 3 cases had been found at the Joslin Clinic in a series of 9,000 cases of mellituria and by 1940 was able to report recognition of 9 cases. He emphasized the likelihood of their being mistakenly classified as examples of renal glycosuria unless the type of urinary sugar is determined. Obviously there is equal danger of their being mistaken for cases of diabetes mellitus and of being treated as such.

The occurrence of chronic pentosuria in association with diabetes mellitus is definitely much less common than its occurrence as an isolated phenomenon. Enklewitz and Lasker [2] were unable to find a single example of the two conditions in one individual, and at the Joslin Clinic [3] only 1 case was noted in which the diagnosis of diabetes mellitus might be justified. All students of the subject agree that pentosuria is found almost exclusively among Jews and predominantly in males. Because the patient who is the subject of the present report is of non-Jewish stock, is female and has undoubted diabetes mellitus along with pentosuria, her condition merits recording as an excessively rare medical curiosity.

From the Evans Memorial, Massachusetts Memorial Hospitals, and the Departments of Medicine and Biochemistry, Boston University School of Medicine.

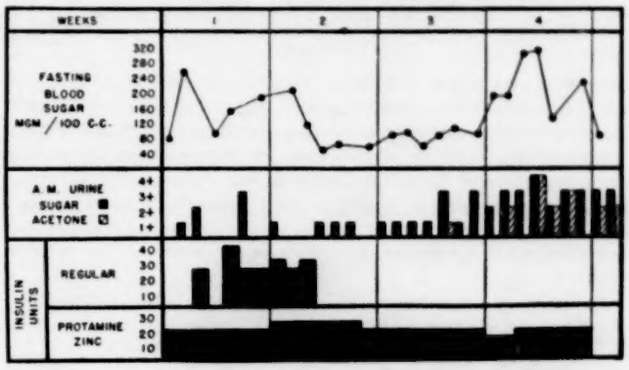
1. Marble, Alexander: Chronic Essential Pentosuria: A Report of Three Cases, Am. J. M. Sc. **183**: 827, 1932.
2. Enklewitz, M., and Lasker, M.: Studies in Pentosuria: A Report of Twelve Cases, Am. J. M. Sc. **186**: 539, 1933.
3. Joslin, E. P.; Root, H. F.; White, Priscilla, and Marble, Alexander: The Treatment of Diabetes Mellitus, Philadelphia, Lea & Febiger, 1940, p. 728.

REPORT OF CASE

O. H., a white woman aged 25, married, was admitted to the Evans Memorial, Massachusetts Memorial Hospitals, on April 28, 1942 for control of her diabetes.

The family history was negative for diabetes mellitus, and the past history was not significant, except for diabetes mellitus.

In April 1928, at the age of 11, she was first admitted to a neighboring hospital, where a diagnosis of diabetes was



Summary of blood and urine sugar reports and insulin dosage.

made. She was found to have a fasting blood sugar of 520 mg. per hundred cubic centimeters and urinary sugar of 11.2 per cent. Regulation was achieved with 20 units of regular insulin before the morning and evening meals. In 1930 she was readmitted because of diabetic coma, from which she rapidly recovered with very little additional insulin. Under careful supervision she progressed normally in school, taking 40 units of regular insulin daily.

In 1938, because of anorexia, she was readmitted to the hospital. Vomiting began in the hospital and acidosis became severe with the carbon dioxide combining power of the plasma falling to 16 volumes per cent on the third day, despite hypoglycemic blood sugar levels. At this time she was shifted to protamine zinc insulin and was satisfactorily controlled by 36 units plus 16 units of regular insulin daily. Thereafter she was in fair health until the fall of 1940, when she developed the first of a series of attacks of right flank pain, fever and vomiting, associated with pus in the urine. A diagnosis of pyelitis was made, and an investigation by means of both intravenous and retrograde pyelography revealed no significant changes in the kidneys. There was persistent vomiting during February and March 1942, but blood sugar levels remained

Urinary Excretion of Dextrose and Pentose in Twenty-Four Hours

	Dextrose, Gm. per 24 Hrs.	Pentose, Gm. per 24 Hrs.
May 14	0.15	1.27
15	0.71	0.88
16	0.61	0.75
17	0.00	1.72
18	1.02	1.45
19	0.29	0.95
20	3.04	2.38
22	2.30	1.12
23	2.96	1.30
24	1.45	0.69
26	3.92	1.25

generally normal, there was no acidosis, and it was possible to reduce her insulin gradually to 24 units of protamine zinc insulin daily. It was noted that, despite normal blood sugar levels, she frequently spilled appreciable amounts of sugar in the urine, although on several occasions the urine was free of reducing substances.

Four weeks before admission to this hospital the patient returned to her home and remained well until five days before admission, at which time she had an insulin reaction. Two subsequent reactions occurred in rapid succession. In each she became unconscious and was restored to normal balance with difficulty. A puzzling feature of these episodes was the

finding of reducing substances in the urine concomitantly with the manifestations of hypoglycemia.

Physical examination showed that she was small and thin. She weighed 89 pounds (40 Kg.) on admission and stated that she had lost 25 pounds (11 Kg.) in the past six months. The pupils responded normally to light and in accommodation. The heart was not abnormal. The lungs were clear and resonant throughout. The abdomen was normal. The blood pressure was 130 mm. of mercury systolic and 70 diastolic.

The pertinent laboratory data are summarized in the chart and the table.

COMMENT

Several tests are available to indicate the nature of the reducing substance found in urine. A pentose does not ferment in the presence of yeast; it gives a specific reaction with Bial's reagent; and, if it is l-xyloketose, it reduces both qualitative and quantitative Benedict's solution at room temperature in the course of several hours.[2] It is possible also to prepare an osazone, which has a specific melting point, and to use polariscopic examination if further exact proof of the type of sugar is desired.

In our case the fermentation test was positive because of the dextrose present, and an osazone was not prepared because of the difficulty of separating the glucosazone from the xylosazone. Reliance was placed routinely on the Bial test and the room temperature reduction test. Many examinations by these methods showed pentose to be almost invariably present. In addition, as shown in the table, quantitative determinations of total urinary sugar by the method of Sumner[4] and of total pentose by the method of Youngburg[5] were carried out on eleven twenty-four hour urine collections. Although there is an appreciable variation in the amount of pentose excreted daily, there is a greater tendency toward a constant output than is discernible in the dextrose output. It is of interest that Enklewitz and Lasker[2] noted a fairly direct relation between body weight and pentose excretion. They showed as well that drugs which are excreted as glycuronates will increase pentose excretion, whereas rest, exercise, thyroid or modification of the carbohydrate or protein content of the diet has no influence on pentose excretion. Because ingestion of large amounts of fruit, particularly plums, cherries, grapes and prunes, rather frequently results in "alimentary pentosuria,"[1] we fed our patient these fruits in abundance, beginning May 22. The results in the table show no significant increase in pentosuria.

The presence of a second sugar in the urine of this patient complicated the management of her diabetes. The history revealed that she had frequently presented the puzzling combination of hypoglycemic symptoms—even to the point of unconsciousness—along with a reducing sugar in the urine. Indeed, it was this clue that led to the suspicion that she might have pentosuria. Under such circumstances it becomes unreliable to attempt to regulate her insulin dosage according to her urinary sugar. Fortunately, she has an unusually keen perception of her own sensations and has been able to correlate these with her blood sugar levels to a remarkable extent. It is hoped that strict adherence to her diet, an occasional fasting blood sugar and attention to minor changes in general feeling will suffice to maintain her diabetes in a satisfactory state of control. As far as the pentosuria is concerned no treatment is necessary or known. All the evidence indicates that chronic essential pentosuria has no detectable influence on health.

SUMMARY

A case of chronic essential pentosuria, occurring in association with diabetes mellitus, was observed. This combination of abnormalities is very rare, and extremely so in a non-Jewish female.

Three simple tests are available for the differentiation of pentose in the urine. Recognition of pentose, when present, is important, as it may significantly complicate the management of diabetes.

4. Sumner, J. B.: A More Specific Reagent for the Determination of Sugar in Urine, J. Biol. Chem. **65**: 393, 1925.

5. Youngburg, G. E.: Studies on Pentose Metabolism: II. A Micro Method for the Determination of Pentoses and Pentosans, J. Biol. Chem. **73**: 599, 1927.

A METAL SAFETY AND GLARE GOGGLE

EDWARD STIEREN, M.D., PITTSBURGH

A safety goggle for industrial use has been designed which has the advantage over glass protective goggles in that it cannot be broken by flying particles, and vision is not interfered with by steam, perspiration or grease.

It consists of two aluminum shields fitted into soft rubber with an adjustable band of the same material to hold them in place.

In the center of the shield is a horizontal opening 1 mm. in width and 40 mm. long. A vertical opening of the same width and 10 mm. long bisects the horizontal opening 10 mm. from the nasal end. In addition a 20 mm. long opening is added at an axis 15 degrees off horizontal for vision in the lower field.

Metal safety and glare goggle.

As its crude prototype was originated by Eskimos to prevent snow blindness, the arrangement of the slots in this goggle by admitting a minimum of light reduces glare, and the goggle can be worn comfortably in bright light.

The goggle was designed by Anthony Flocker, M.E., and is marketed by the Kerlo Corporation, 521 Fifth Avenue, New York.

Union Trust Building.

The safety goggle was demonstrated by Dr. Stieren before the Section on Ophthalmology at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

TROMBIDIOSIS (CHIGGER BITES)

RELIEF OF ITCHING WITH ETHYL AMINOBENZOATE IN FLEXIBLE COLLODION

RICHARD L. SUTTON JR., M.D., KANSAS CITY, MO.

Use of the following prescription, designed at the insistent demand of a frantic colleague, Dr. Wade Miller, provided him with the best relief of any chigger bite antipruritic he ever tried, and he has tested many:

	Gm. or Cc.	
℞ Ethyl aminobenzoate	2	gr. xxx
Flexible collodion	15	ʒss

Put in bottle with rod in stopper.
Sig. Paint itching bite as required for relief of itching.
Keep away from flame.
Keep tightly stoppered.

Application of this clear, colorless, camphoraceous, locally anesthetizing, nonirritant, adhesive, inconspicuous medicine stops sensation for from four to eight hours, enabling the sufferer to sleep at night and to live in comparative comfort through the period required for healing. It has given satisfaction to several patients of mine. I should expect it to be as useful for any other kind of bite. I should hesitate to use it on large areas of skin. If a hemolytic Staphylococcus aureus happens to be imprisoned beneath the collodion, as I have observed, a small bleb, tense with seropurulent fluid, quickly develops. This may

be drained and wiped with 2 per cent aqueous solution of methylrosaniline, which is promptly curative.

As a repellent, I know of nothing superior to Sta-Way, made by National Carbon Company, Inc., New York. I do not know its ingredients. It has not irritated the skin of any patient I have seen.

1102 Grand Avenue.

LABORATORY INFECTION WITH THE VIRUS OF LYMPHOCYTIC CHORIOMENINGITIS

A TWO YEAR STUDY OF ANTIBODY RESPONSE

ALBERT MILZER, PH.D., AND SIDNEY O. LEVINSON, M.D.,
CHICAGO

Although many investigators have been actively engaged in experimental work with the virus of lymphocytic choriomeningitis or with infected animals, comparatively few have contracted the disease or, of those tested, few have developed neutralizing antibodies in their serum.[1] Lépine and Sautter [2] were first to report a laboratory infection of lymphocytic choriomeningitis. Virus was isolated from their patient's blood and urine, and complement fixing antibodies were demonstrated in the patient's serum during convalescence. The serums of 2 persons who had worked for two years with the same virus strain and infected animals failed to fix complement. Lépine and Sautter mention no attempt to detect virus neutralizing substances in their patient's serum. They believe that their patient became infected nine days before onset of symptoms by fragments of contaminated glass that were accidentally splattered into her eye during the process of grinding infected guinea pig tissues with powdered glass. More recently Armstrong and Hornibrook [3] have described a case without central nervous system manifestations in a laboratory worker engaged in choriomeningitis research at the National Institute of Health, but the manner of infection is not discussed. The virus was isolated from the blood, and the patient developed a high titer of specific neutralizing antibodies six weeks after the attack. Armstrong [4] also states that "a number of cases of choriomeningitis have developed among laboratory personnel handling infected mice." He, however, does not elaborate on details of the degree of contact or manner of infection.

The usual experience of noninfectivity by exposure to the virus and infected animals among laboratory workers is also borne out in animal experimentation. Various workers [5] have noted that normal mice and guinea pigs are not readily infected by contact with artificially infected animals. Traub [6] and Haas,[7] however, have shown that white mice transmit infection to their offspring in utero and in infancy and that naturally infected mice transmit infection by contact more readily than artificially infected animals.

Because the natural mode of transmission of lymphocytic choriomeningitis in either man or infected animals is unknown, we feel that it is important to record the following case of laboratory infection in one of us (A. M.), in which there is evidence that infection came from contact with infected monkey lice. This is discussed in detail. The virus of lymphocytic choriomeningitis was isolated from the spinal fluid during the acute stage, and both neutralizing and complement fixing antibodies against the isolated and two known strains of virus were detected in the serum during subsequent recovery. Blood specimens were obtained at frequent intervals during and following convalescence and as long as twenty-six months after the attack in order to determine the time of appearance and respective titers of complement fixing and neutralizing antibodies in his serum.

REPORT OF CASE

A. M., a white man aged 23, admitted to the hospital on Aug. 2, 1939, complained of severe frontal headache for two days. Twelve days previously the patient had a severe upper respiratory infection, which gradually improved, although it had not completely cleared up with the onset of the present illness. The day before admission he had chilly sensations, profuse sweating, generalized weakness, and pain in the back and in the back of the neck. There had been constipation for two days.

The patient was well nourished, quite prostrated and rather lethargic. His temperature was 103.4 F. rectally, pulse rate 100 and respiratory rate 22 per minute. His face was flushed, and he was covered with profuse sweat. The general physical examination was otherwise completely negative. There was definite neck resistance to anterior flexion and decided back resistance, so that the patient could not bend over. Muscle power in all extremities was good, and reflexes were equal and active. No pathologic signs were present.

For the next two days the temperature ranged between 102 and 105 F. The headache continued very severe, and the patient complained, in addition, of pain behind the eyeballs. In the afternoon of August 3 a lumbar puncture was performed, which yielded 10 cc. of clear spinal fluid under normal pressure. Examination of the spinal fluid revealed 8 lymphocytes per cubic millimeter, a total protein content of 51 mg. per hundred cubic centimeters and a sugar content of 67 mg. On August 4 his leukocyte count was 4,350 per cubic millimeter, of which 73 per cent were polymorphonuclear leukocytes with a shift to the left, 21 per cent lymphocytes and 6 per cent monocytes. In addition to the leukopenia, the throat was reddened and several small grayish ulcers were noted in the left tonsillar fossa.

The patient continued acutely ill for the next several days with headache, myasthenia and loss of weight. The temperature continued to range from 101 to 104 F. Repeated blood cultures showed no growth. The white blood count rose to 7,850 per cubic millimeter on August 5 and remained between 5,000 and 8,000 until August 10, after which it varied between 12,000 and 16,000. Stool cultures were negative for intestinal pathogens, but on August 11 and August 12 Endameba histolytica trophozoites and cysts were observed. Agglutination tests of serum specimens taken on August 7 and August 17 for typhoid, paratyphoid A and B, tularemia, Brucella abortus, Brucella melitensis, Bacterium shigae, Bacterium sonnei and Bacterium paradysenteriae (Flexner and Hiss) were negative, as were the Weil-Felix reaction and heterophil agglutination. The Wassermann and Kahn reactions of the blood were negative. A roentgenogram of the chest was normal.

The temperature dropped to about 100 F. on August 9, and a low grade fever persisted for the next week. On August 14 emetine therapy was started; the patient was given ½ grain (0.03 Gm.) of emetine hydrochloride on the first two days and then a grain (0.06 Gm.) daily subcutaneously for the next six days. Carbarsone was then administered. The patient's temperature became normal on August 16 and remained normal until he was discharged on August 22. During hospitalization the patient lost 17 pounds (7.7 Kg.) and he did not completely regain his weight and strength until three months after discharge. No residual after-effects from this illness have been noted.

From the Samuel Deutsch Serum Center, Michael Reese Hospital.

1. Blackfan, K. D.: Lymphocytic Choriomeningitis, in Virus and Rickettsial Diseases, Cambridge, Mass., Harvard University Press, 1940, p. 684.

2. Lépine, P., and Sautter, V.: Contamination de laboratoire avec le virus de la choriomeningite lymphocytaire, Ann. Inst. Pasteur **61**: 519-527 (Nov.) 1938.

3. Armstrong, Charles, and Hornibrook, J. W.: Choriomeningitis Virus Infection Without Central Nervous System Manifestations: Report of a Case, Pub. Health Rep. **56**: 907-909 (April 25) 1941.

4. Armstrong, Charles: Studies on Choriomeningitis and Poliomyelitis, Harvey Lectures **36**: 39-65, 1940-1941.

5. Traub, Erich: The Epidemiology of Lymphocytic Choriomeningitis in White Mice, J. Exper. Med. **64**: 183-200 (Aug. 1) 1936. Shaughnessy, H. J., and Milzer, Albert: Experimental Infection of Dermacentor Andersoni Stiles with the Virus of Lymphocytic Choriomeningitis, Am. J. Pub. Health **29**: 1103-1108 (Oct.) 1939. Rivers and Scott.[10] Shaughnessy and Zichis.[9]

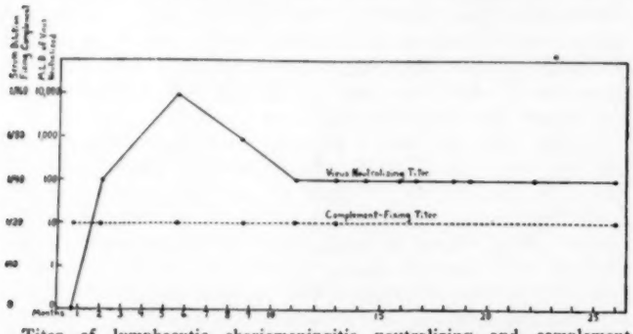
6. Traub, Erich: Epidemiology of Lymphocytic Choriomeningitis in a Mouse Stock Observed for Four Years, J. Exper. Med. **69**: 801-817 (June 1) 1939.

7. Haas, V. H.: Studies on the Natural History of the Virus of Lymphocytic Choriomeningitis in Mice, Pub. Health Rep. **56**: 285-292 (Feb. 14) 1941.

EXPERIMENTAL RESULTS

In previous publications[8] our stock guinea pigs and white mice were shown to be free from latent choriomeningitis infection by repeated intracerebral inoculations with sterile corn starch (Kingsford's), broth, normal brain suspensions and 52 spinal fluid specimens from various human central nervous system infections. Furthermore, we have not encountered any stock animals that were immune to inoculation with known virus. Rectal thermometers which were used to take guinea pig temperatures were disinfected in solution of formaldehyde U. S. P. diluted 1:10 to eliminate the possibility of intrarectal transmission of the virus reported by Shaughnessy and Zichis.[9] No ectoparasites were noted on stock guinea pigs and mice, and all animals were housed in new quarters free from infestation with bedbugs, cockroaches, house mice and domestic rats, so that the possibility of infection arising from these sources was minimized.

Two cubic centimeters of cerebrospinal fluid taken from the patient on Aug. 3, 1939 was inoculated subcutaneously into a guinea pig weighing 440 Gm. Five-tenths cubic centimeter seeded into suitable aerobic and anaerobic culture mediums and incubated at 37 C. showed no growth in fourteen days. The inoculated guinea pig had a temperature of 105.8 F. three days after inoculation and died in twelve days. This animal lost approximately 30 per cent of its initial body weight. At necropsy, the brain was macroscopically hyperemic, and areas of interstitial bronchopneumonia were seen in stained lung



Titer of lymphocytic choriomeningitis neutralizing and complement fixing antibodies in patient's serum at various intervals during convalescence and after recovery.

sections. No bacteria were isolated from the brain tissues and heart blood cultured in aerobic and anaerobic mediums.

The brain was removed aseptically, and a 10 per cent suspension by weight was prepared in buffered saline solution. Five-tenths cubic centimeter was injected subcutaneously into a second guinea pig, weighing 430 Gm., and 0.03 cc. intracerebrally into each of 5 white mice. On the seventh day all inoculated mice had ruffled coats and severe body tremors. The mice all died the next day with characteristic signs of experimental lymphocytic choriomeningitis.[10] In each instance no bacteria were isolated from the brain tissues and heart blood. The second passage guinea pig had pyrexia (104.4 F.) two days after inoculation and died seven days later. It also lost approximately 30 per cent of its initial body weight. Its brain was grossly hyperemic, and an interstitial bronchopneumonia was noted in stained lung sections. The brain tissues and heart blood were bacterially sterile.

The virus was then transferred to a third passage guinea pig, which was killed while moribund in order to identify virus present in its brain tissues by means of a specific serum neutralization test. The technic of this test is described in a previous publication.[11] The recovered virus was shown to be that of lymphocytic choriomeningitis because guinea pigs inoculated with mixtures of undiluted monkey lymphocytic choriomeningitis antiserum[12] and serial tenfold virus dilutions ranging from 10^{-1} to 10^{-4} were completely protected, while control guinea pigs inoculated with mixtures of normal monkey serum and the same virus dilutions succumbed in nine to fifteen days with typical signs of choriomeningitis.[10] At the time of the neutralization test the virus titer was 10^{-4}.

The new strain was maintained by subcutaneous inoculation in guinea pigs. It was found by titration experiments that it had reached its maximum pathogenicity after the tenth passage, so that it would consistently kill guinea pigs when 0.5 cc. of a 10^{-5} dilution in buffered saline solution was inoculated subcutaneously. To date the virus has been passed for 106 generations and is as virulent for guinea pigs and white mice as the W. E. (Rivers) and J. P. strains.[11]

Other studies show that there is a complete cross immunity between the isolated (A. M.) strain, the W. E. (Rivers), the J. P. strain and the Coggeshall strains,[13] as demonstrated by resistance to challenge inoculations in white mice which had been infected and had recovered. The new strain suspended in nutrient broth of p_H 7.2 (5 per cent brain tissue suspension) and centrifuged at 2,000 revolutions per minute for ten minutes to remove large tissue particles readily passes through previously tested Berkefeld N and W candles at a negative pressure of 31 cm. of mercury. It has also been successfully cultivated for ten passages on the chorioallantoic membrane of the developing chick embryo apparently without loss of virulence. Other studies on cultivation of the virus in the developing chick embryo are now in progress and will be reported later. Microscopic examinations of brains of guinea pigs and white mice that succumbed to the new strain revealed round cell infiltration of the meninges and choroid plexus identical or very similar to that produced by the W. E.,[10] J. P. and Coggeshall strains of virus.[14]

Specimens of serum obtained from the patient three weeks after the onset of illness, at frequent intervals during convalescence and after complete recovery had occurred were titrated for both neutralizing and complement fixing antibodies against the virus. The results are shown in the accompanying chart. As previously stated, the new strain had reached its maximum virulence after the tenth guinea pig passage and has been continuously passaged since isolation without alteration. Thus, all serum specimens after the first have been titrated against a stabilized virus. The neutralization tests were performed by inoculating guinea pigs subcutaneously with mixtures of equal parts of undiluted serum and serial tenfold virus dilutions according to the technic already described.[11] Each specimen of serum was titrated for neutralizing antibodies at least twice and in some instances as much as six times in connection with other studies.[14] In the majority of instances the same titer was obtained in duplicate tests. The complement fixation test was performed with an antigen consisting of saline extracts of pooled infected guinea pig spleens using essentially the same technic described by Smadel, Baird and Wall.[15] In order to eliminate false positive reactions,[16] the antigen was stored several weeks at 5 C. before use. Known negative and positive control serums were included in all titration experiments.

It is interesting to note that complement fixing antibodies were present three weeks after the onset of symptoms and persisted at the same level for twenty-six months after recovery, as shown on the chart. On the other hand, neutralizing antibodies were not detected three weeks after onset of symptoms but appeared after eight weeks, reaching a maximum titer in five and a half months and then declining so that a constant level was reached eleven months after onset of symptoms. These results parallel those of Smadel and his associates,[15] who

8. Shaughnessy and Milzer.[5] Leichenger, Milzer and Lack.[11] Milzer.[14]
9. Shaughnessy, H. J., and Zichis, Joseph: Infection of Guinea Pigs by Application of Virus of Lymphocytic Choriomeningitis to Their Normal Skins, J. Exper. Med. **72**: 331-343 (Oct. 1) 1940.
10. Rivers, T. M., and Scott, T. F. McN.: Meningitis in Man Caused by a Filtrable Virus: II. Identification of the Etiologic Agent, J. Exper. Med. **63**: 415-432 (March 1) 1936.
11. Leichenger, Harry; Milzer, Albert, and Lack, Herbert: Recurrent Lymphocytic Choriomeningitis Treated with Sulfanilamide: Isolation of Virus, J. A. M. A. **115**: 436-440 (Aug. 10) 1940.
12. The lymphocytic choriomeningitis monkey antiserum was furnished by Dr. Charles Armstrong of the National Institute of Health.
13. Coggeshall, L. T.: The Transmission of Lymphocytic Choriomeningitis by Mosquitoes, Science **89**: 515-516 (June 2) 1939. Milzer.[14]
14. Milzer, Albert: Studies on the Transmission of Lymphocytic Choriomeningitis Virus by Arthropods, J. Infect. Dis. **70**: 152-172 (March-April) 1942. Shaughnessy and Milzer.[5]
15. Smadel, J. E.; Baird, R. D., and Wall, M. J.: Complement Fixation in Infections with the Virus of Lymphocytic Choriomeningitis, Proc. Soc. Exper. Biol. & Med. **40**: 71-73 (Jan.) 1939.
16. Smadel, J. E.; Wall, M. J., and Baird, R. D.: A Soluble Antigen of Lymphocytic Choriomeningitis: II. Characteristics of the Antigen and Its Use in Precipitin Reactions, J. Exper. Med. **71**: 43-53 (Jan.) 1940.

reported that complement fixing antibodies were detected in guinea pigs two weeks after inoculation, while neutralizing antibodies were not demonstrable before the fourth to the sixth week. Our results differ from those of Smadel, however, in that the titer of complement fixing antibodies was the same twenty-six months after the attack, while Smadel noted a decline in titer after the peak was reached six weeks after onset of the disease. Moreover, he found that serums taken from patients six to eight weeks after onset of the disease fixed complement and neutralized the virus, while serum drawn one and one-half to three years after the disease in the same patients still neutralized the virus in all but 1 instance, but none definitely fixed complement.

The immune serum was also found to possess neutralizing and complement fixing antibodies in the same titer against the J. P. strain as for the new strain of virus six months after onset of symptoms and on numerous occasions since then. It also neutralized the W. E. (Rivers) and the Coggeshall strains of choriomeningitis virus. Serum collected twenty-six months after the attack failed to neutralize the D. 219 strain of the St. Louis type of encephalitis virus [17] and the B. A. I. strain of the western type of equine encephalomyelitis virus [18] in neutralization tests performed according to the technic described by Howitt.[19]

SOURCE OF INFECTION

About six days before onset of illness the patient was engaged in an experiment attempting to transmit the virus of lymphocytic choriomeningitis from monkey to monkey by means of the rhesus monkey louse, Eupedicinus longiceps (Paiget [20]). During the experiment the patient noted several lice on his hand, which had come from handling a monkey dying from experimental lymphocytic choriomeningitis. Other lice which were recovered from the infected monkey on the same day were ground in saline solution and injected subcutaneously into a guinea pig, and the animal succumbed with typical signs of lymphocytic choriomeningitis in ten days. Dr. H. E. Ewing,[21] of the United States Bureau of Entomology and Plant Quarantine, states that monkey lice are known to bite man.

Although the patient is not certain that the lice bit him, circumstantial evidence would seem to indicate that they were the source of his infection. It is possible, of course, that infection may have resulted from skin contamination with infected louse excreta or with infected crushed lice, since Shaughnessy and Zichis [9] have shown that the virus can penetrate the normal, unscarified skin of guinea pigs. The patient had worked with the virus in the laboratory for almost two and one-half years and was always careful to observe the usual precautions taken in handling infectious agents. About one year previously some infected guinea pig brain tissue had accidentally splattered into his eye without resulting illness or development of specific neutralizing antibodies. Immediately after the accident his eye was rinsed several times with a weak aqueous solution of boric acid. Fortunately, at the time of the accident the infectious material was free from sand or other abrasives. In this respect our case differs from that reported by Lépine and Sautter, in which infection resulted from contaminated fragments of glass that flew into their patient's conjunctiva. Lépine and Sautter had failed to prevent infection by instilling 2 per cent solution of mild protein silver into their patient's eye immediately after the accident. It is interesting to note that the incubation period before onset of symptoms was nine days in the case of Lépine and Sautter, while it was six days in ours. The similarity of incubation is additional evidence that our patient may have been infected by the monkey lice.

Later experiments which were carried out prove that the virus survives for at least twenty-four hours after infected lice are removed from their host and kept at room temperature (22 to 25 C.).[14] One attempt to transmit infection from an infected to a normal rhesus monkey by uncontrolled feeding of the monkey lice failed. Armstrong,[4] however, has recently announced successful transmission of infection in 2 of several trials by transferring approximately 100 lice taken from an infected monkey to a normal one.

COMMENT

There are a number of aspects of this case which are interesting. First, it should be pointed out that, although the patient had clinical meningeal irritation, the spinal fluid showed no increase of cells and that therefore the usual routine examination of the spinal fluid would have resulted in completely missing the diagnosis. A normal spinal fluid during the early acute stage of lymphocytic choriomeningitis has to our knowledge not been previously reported, although Howard [22] recorded 1 case in which it was normal nine days after onset. The symptomatology actually indicates a disturbance of an encephalitic character. Furthermore, the disease was far from "benign." This adjective has been dropped in recent discussion, but it should be stressed that this illness may be quite severe because it may be accompanied by paresis or paralysis. We have observed such occurrence in our own experience, and it has been described by others.[23] Further evidence that the disease is not necessarily a mild one is borne out by the reports of fatal cases in which virus was isolated.[22]

A very interesting sidelight during the observation of this case was leukopenia. The white blood cell count was so low that, although there was no granulopenia, pentnucleotide was administered. This was done because in addition to the leukopenia we observed small pharyngeal ulcers.

The finding of cysts and trophozoites of Endameba histolytica led us to believe that this was a very atypical case of amebic dysentery. As the case ultimately turned out, we realized that this was an incidental finding in a condition which had probably existed for an indefinite time in an unrecognized form. The therapy cleared this infection completely.

As has been reported by Scott and Rivers,[24] virus neutralizing antibodies are not detected in serum taken during the acute stage. However, as shown in the chart, virus neutralizing substances did appear during convalescence and rose to a certain level, which has been maintained for more than two years. This is additional confirmation of the fact that the patient had an attack of lymphocytic choriomeningitis and also is significant in indicating the duration of persistence of the virus neutralizing substances in the blood stream.

Although there is no direct proof that lymphocytic choriomeningitis is insect borne, there is evidence that this disease can be transmitted by certain arthropods in laboratory experiments. Thus, Shaughnessy and Milzer [5] reported experimental infection of all stages of the life cycle of the Rocky Mountain wood tick (Dermacentor andersoni). Coggeshall [13] was able to transmit the virus from guinea pig to guinea pig by the bites of infected Aedes aegypti mosquitoes. The senior author has confirmed Coggeshall's work [14] and has also shown that bedbugs and a species of blood sucking mite (Atricholaelaps glasgowi) can transmit lymphocytic choriomeningitis experimentally. As mentioned before, we have shown that the virus can survive for at least twenty-four hours in infected rhesus monkey lice (Eupedicinus longiceps), but we were unable to transmit infection in a single uncontrolled feeding experiment, while Armstrong succeeded in transmitting infection in two of several trials. Findlay, Stuart-Harris and MacCallum [25] showed in a recent publication that the lymphocytic choriomeningitis

17. Obtained from Dr. Charles Armstrong of the National Institute of Health.
18. Obtained from Dr. Joseph Zichis of the Illinois Department of Public Health.
19. Howitt, B. F.: Viruses of Equine and of St. Louis Encephalitis in Relationship to Human Infections in California, 1937-1938, Am. J. Pub. Health **29**: 1083-1097 (Oct.) 1939.
20. Identified by Dr. H. E. Ewing, of the United States Bureau of Entomology and Plant Quarantine.
21. Personal communication to the authors
22. Howard, M. E.: Infection with the Virus of Choriomeningitis in Man, Yale J. Biol. & Med. **13**: 161-180 (Dec.) 1940.
23. Findlay, G. M.; Alcock, N. S., and Stern, R. O.: The Virus Etiology of One Form of Lymphocytic Meningitis, Lancet **1**: 650-654 (March 21) 1936. MacCallum, F. O., and Findlay, G. M.: Lymphocytic Choriomeningitis: Isolation of the Virus from the Nasopharynx, ibid. **1**: 1370-1373 (June 17) 1939.
24. Scott, T. F. McN., and Rivers, T. M.: Meningitis in Man Caused by a Filtrable Virus: I. Two Cases and the Method of Obtaining a Virus from Their Spinal Fluids, J. Exper. Med. **63**: 397-414 (March) 1936.
25. Findlay, G. M.; Stuart-Harris, C. H., and MacCallum, F. O.: Lymphocytic Choriomeningitis with Report of Case, J. Roy. Army M. Corps **75**: 8-15 (July) 1940.

virus was retained "for at least some hours" in human body lice (Pediculus humanus var. corporis) that were allowed to feed on an infected monkey. Other arguments suggesting that lymphocytic choriomeningitis might be an arthropod borne disease in nature are summarized in a previous publication.[14] In view of the recent evidence that gray mice (Mus musculus)[26] and dogs[27] may possibly be a reservoir of this disease from which man may become infected, further work along these lines of epidemiology and transmission might further elucidate this problem.

SUMMARY

In a case of laboratory infection of lymphocytic choriomeningitis, virus was isolated from the apparently normal spinal fluid during the acute stage and the patient subsequently developed a high concentration of both complement fixing and virus neutralizing antibodies, the titer of which was studied over a period of twenty-six months. The infection may have come from contact with infected rhesus monkey lice.

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Special Clinical Article

PROGRESS IN THE ARMY'S FIGHT AGAINST MALARIA

CLINICAL LECTURE AT ATLANTIC CITY SESSION

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The entry of the United States into the present war and the dispatch of American troops to fight in new tropical regions all over the world has restored malaria to its former position as one of the Army's most important disease hazards. Malaria has always threatened our armed forces, and throughout the century and a half of our national existence the medical department of the Army has been engaged in a continuous fight against this ancient military scourge. Prior to 1900 the malarial fevers were one of the most serious causes of disability and death, during both war and peace, and little or no progress was made in their prevention until the beginning of the present century. Since that time, the rapid development of information concerning the mosquito transmission of malaria has afforded control methods which have been applied successfully, especially among troops living in permanent garrisons in the continental United States. This has caused a spectacular decrease in the malaria admission rates for the total army, and during recent years most of the infections have occurred among men living under field conditions in endemic regions.

The latter fact has a significant bearing on the importance of malaria during the present military emergency. The difficulties encountered in the control of malaria in the field during peacetime are naturally increased under the infinitely more trying conditions of war. Moreover, a much larger proportion of the troops will be exposed to malaria because of the extensive tropical areas to be occupied. Thus the medical department and the entire medical profession are faced with the vital problem of protecting American troops against malaria under all of the varied and difficult conditions to be encountered during this war.

In order to visualize the scope of the present problem, it is proposed (1) to review briefly the Army's past experience with malaria, (2) to indicate certain new malaria hazards created by the present military situation and (3) to mention some of the more important measures that have been adopted by the Army in order to develop an effective wartime malaria control program.

THE ARMY'S PAST EXPERIENCE WITH MALARIA

The United States Army has never been free from malaria. The disease was widely distributed in this country during the colonial period, and it has occurred among American soldiers during each of the one hundred and sixty-seven years that have passed since the battle of Lexington.

For convenience, the Army's experience with malaria may be divided into three periods, characterized respectively by the availability of specific information concerning (1) the treatment, (2) the etiology and (3) the transmission of the disease.

1. *Period of Clinical Recognition* (1776-1880).—During the first of these periods, from 1776 to 1880, there was no information as to the cause of malaria or of the manner of its transmission. However, the disease was recognized clinically, and cinchona bark and later quinine were available for treatment. Boyd,[1] quoting Blanton,[2] states "As early as 1776 the Continental Congress ordered the Medical Committee to forward 300 pounds of Peruvian bark to the Southern department for the use of the troops"; also "Jackson,[3] a British Army surgeon attached to one of the regiments of Lord Cornwallis's Army, made extensive use of Peruvian bark in treating the abundant intermittent fevers from which the British Army suffered in its Southern campaign." Quinine was isolated in 1820, and three years later it was prepared commercially in Philadelphia. Within a short time quinine replaced the bark in treatment, and before and during the Civil War it was used as a prophylactic.

The malaria rates for the Army from 1776 to 1818 are not available, but the disease was a common cause of sickness, disability and death throughout that period. During the next sixty-one years the annual admission rates of white troops per thousand in the United States varied from lows of 200 to highs of around 1,000, as is shown in figure 1. In other words, from 20 to about 100 per cent of the troops were infected during these years. Indeed, malaria was more prevalent than typhoid, and often it was responsible for more than one fourth of the total disease admissions to army hospitals. The malaria mortality was also relatively high during this period. Prior to 1870 the mortality rates per thousand varied from lows of 0.22 to highs of 8, and during the next decade from lows of 0.23 to highs of 1.3.

Throughout this early period, malaria occurred in all sections of the United States, but it was most prevalent among troops located in the South. The disease was most common during periods of war, and in the latter years of the Civil War the infection was almost universal.

26. Armstrong, Charles; Wallace, J. J., and Ross, Louis: Lymphocytic Choriomeningitis: Gray Mice, Mus Musculus, a Reservoir for the Infection, Pub. Health Rep. **55**: 1222-1229 (July 5) 1940.

27. Dalldorf, Gilbert: The Simultaneous Occurrence of the Viruses of Canine Distemper and Lymphocytic Choriomeningitis, J. Exper. Med. **70**: 19-27 (July 1) 1939.

Read in the General Scientific Meetings at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 9, 1942.

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1. Boyd, M. F.: Historical Introduction to the Symposium on Malaria: A Symposium on Human Malaria, publication 15, Washington, D. C., American Association for the Advancement of Science, 1941.

2. Blanton, W. B.: Medicine in Virginia in the Eighteenth Century, Richmond, Va., W. Byrd Press, 1931.

3. Jackson, R.: A Treatise on the Fevers of Jamaica with Some Observations on the Intermitting Fevers of America, London, J. Murray, 1791.

2. *Period of Etiologic Knowledge* (1880-1900).—Information as to the cause of malaria was available during the last two decades of the nineteenth century. As early as 1876 Joseph Jones identified malaria plasmodia in dried human blood.[4] Army surgeon Lavaran demonstrated the organism in the blood of a patient. Six years later, George M. Sternberg, who subsequently became the Surgeon General of the Army, demonstrated malaria parasites to Dr. William H. Welch in the latter's laboratory in Baltimore.[1] However, this knowledge spread slowly, and specific diagnostic methods were not generally used until much later.

The Army's annual admission rates for malaria declined from 200 per thousand in 1880 to a level of about one half that figure during the period 1887-1897. A similar decrease in mortality occurred. In 1880 the annual death rate per thousand was 0.56, and from 1889 to 1898 it was less than 0.2. This reduction in malaria was influenced by many factors including the agricultural development and civic improvement in communities near Army garrisons. However, in many posts the rates remained extremely high, and a large percentage of the troops were infected each year.

When the Spanish-American War began much of the pioneer experimental work on the mosquito transmission of malaria had been done, but the results were neither complete nor generally accepted. American troops were exposed to infection both in the United States and on the tropical frontiers established during the war, and the incidence of malaria increased abruptly.

In 1898 the admission rate for the total Army rose to 640 and the death rate to 2.3 per thousand. The disease was common in Cuba, and after the capture of Santiago about half of our forces there were disabled by malaria.

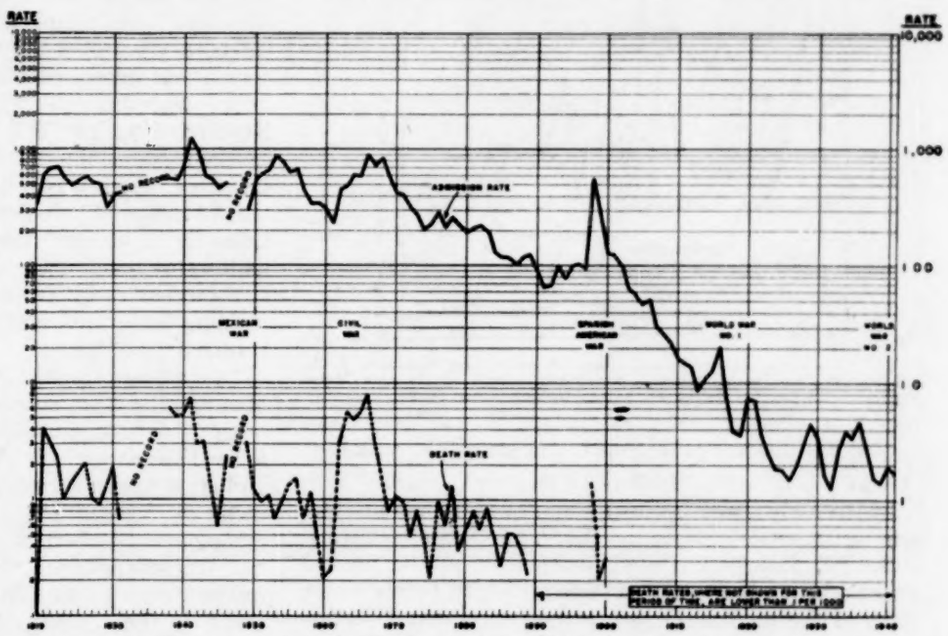

Fig. 1.—Malaria in the United States Army: annual admission and death rates per thousand white enlisted men in the continental United States (from U. S. Army Medical Museum negative 73243).

3. *Period Since Discovery of Mosquito Transmission* (1900-1942).—The third period, which began in 1900, just after the discovery of the mosquito transmission of malaria, has been characterized by great progress in the control of the disease in the Army. During the American occupation of Cuba subsequent to 1900 Gorgas and LePrince [5] demonstrated the effectiveness of mosquito control. However, with a few exceptions anti-mosquito sanitation was not practiced extensively in the United States until more than a decade later. During the period 1904 to 1914 Gorgas and his associates carried on their monumental malaria control campaign in Panama and obtained results which convinced the world of the importance of attacking the mosquito vectors. About 1912 the U. S. Public Health Service started field studies of malaria in the southern part of the United States which later resulted in rather extensive mosquito control programs in various civilian areas.

The value of these control activities to the Army is clearly reflected in the rapid decline in the annual malaria infection rates during the present century. As shown in figure 2, the rate per thousand for all white troops in the Army, regardless of location, was over 700 in 1900. For the next three years the rates were 392, 254 and 183 respectively, and in 1916 the rate was 41. During World War I relatively few of our overseas forces were located in malarious regions, and the troops in this country were protected by an effective anti-mosquito campaign. In 1917, 1918 and 1919 the annual rates were 9.5, 2.7 and 1.9 respectively. Since that time they have varied from a high of 10.9 per thousand in 1921 to lows of 3.8 in 1938 and 1939. The annual death rates for the entire period from 1900 to date have been less than 0.1 per thousand. The influence of geographic location is indicated in this chart by a comparison of the admission curves for white troops located in the continental United States, the Philippines and in Panama. The decided difference between the relatively high prevalence in Panama compared with that in the Philippines may be attributed to many factors including differences in the habits of the anopheline vectors of the two tropical regions.[6]

Thus it may be stated that under the conditions which have prevailed in the Army during the present century, the medical department has been highly successful in its campaign against malaria. By the vigorous application of all the control methods available, it has been possible to protect troops living in permanent garrisons both at home and abroad. A large proportion of the reported cases have occurred in endemic regions in the southern part of the United States and in our tropical possessions. The incidence of malaria among troops stationed in Panama has been much higher than in the

4. Jones, Joseph: Medico-Legal Evidence Relating to the Detection of Human Blood, Presenting the Alterations Characteristic of Malarial Fever, on the Clothing of a Man Accused of the Murder of Narcisse Arrieux, Dec. 27, 1876, Near Donaldsville, New Orleans M. & S. J., August 1878, p. 139. In 1880 the French army surgeon Lavaran demonstrated the living organism in the blood of a patient.

5. LePrince J. A., and Orenstein, A. J.: Mosquito Control in Panama, New York, G. P. Putnam Sons, 1916.

6. Simmons, J. S., and others: Malaria in Panama, American Journal of Hygiene Monographic Series, No. 13, Baltimore, Johns Hopkins Press, January 1939.

Philippines owing to differences in the anopheline vectors in the two locations. Most of these infections have been in soldiers unusually exposed to mosquitoes at night while on guard or on field duty during training expeditions.

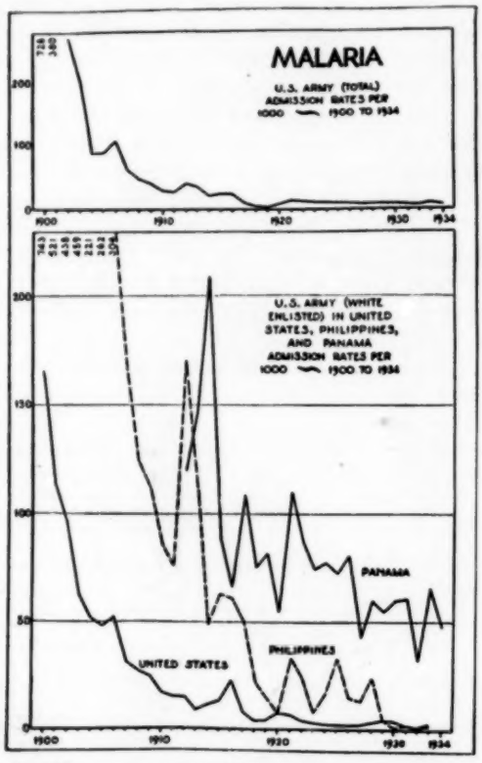

Fig. 2.—Malaria among United States troops (from Simmons, J. S., and others: Malaria in Panama, American Journal of Hygiene Monographic Series No. 13, Baltimore, Johns Hopkins Press, 1939).

NEW MALARIA HAZARDS CREATED BY THE PRESENT WAR

In 1939 when war in Europe appeared imminent there was very little malaria in the United States Army. However, anticipating our involvement in the present world conflict, the Surgeon General began to revise the plans of the medical department to meet any situation that might arise. An important feature of these plans was the strengthening and modification of the Army's program for the control of malaria under the conditions peculiar to mobilization and war. The wisdom of this course was borne out by subsequent events, which rapidly elevated malaria from the status of a disease nuisance to the position of a dangerous hazard. These events were (1) the rapid mobilization of our defense Army and the concentration of troops for training in Southern areas in which malaria is endemic, (2) the development of fortifications in our tropical bases in the Caribbean and (3) the wide dissemination of American troops in the tropical regions of the world which followed our entry into the war.

THE WARTIME PROGRAM FOR THE CONTROL OF MALARIA

The scope of the Army's wartime program for the control of malaria may be visualized by a brief consideration of (1) certain general measures which augment the program, (2) the results of an intensified anti-mosquito campaign inaugurated in all permanent camps during 1939 and (3) plans which have been made for the protection of combat forces in malarious regions abroad.

1. *General Measures.*—Some of the general measures that are of importance in connection with the present program will be mentioned.

(*a*) The Preventive Medicine Service: The first of these measures was the establishment in the Office of the Surgeon General, during 1940, of a section now designated as the Preventive Medicine Service. This service includes a subdivision devoted entirely to the control of malaria and other tropical diseases, which is directed by an eminent malariologist with an extensive international experience in the practical control of the disease.

(*b*) The Commission on Tropical Diseases; Army Board for the Control of Epidemics: During the same year there was organized under the Preventive Medicine Service a group of civilian consultants to the Secretary of War known as "The Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the United States Army." This board, which is now composed of 110 consultants, includes nine special commissions one of which is the "Commission on Tropical Diseases." Its members are available at all times for emergency work in the field should they be required to combat epidemics of tropical diseases.

(*c*) Subcommittee on Tropical Medicine, National Research Council: The Surgeon General has also been assisted materially by the Subcommittee on Tropical Diseases, which was organized in 1940 at his request by the Division of Medical Sciences, National Research Council. This subcommittee has advised the Army on matters of policy and has helped in the preparation of circular letters on tropical diseases, in the planning of training programs and in the promotion of necessary research projects.

(*d*) Other Health Agencies: The Army has also obtained the close cooperation and assistance of various other health organizations. These include the Rockefeller Foundation, the American Red Cross, the federal and state health services and the United States Department of Agriculture. During 1940 the Army made arrangements whereby the United States Public Health Service supplements the anti-mosquito work done on military reservations, by sanitating extramilitary civilian areas, in the United States, Puerto Rico and Hawaii. More recently plans have been made for similar extra-

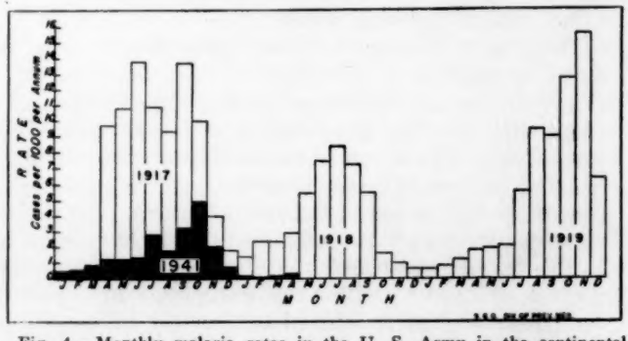

Fig. 4.—Monthly malaria rates in the U. S. Army in the continental United States during 1941, as compared to 1917, 1918 and 1919 (total monthly admissions per annum; from U. S. Army Medical Museum negative 73214).

military work to be done in certain foreign areas of the Western Hemisphere by the Coordinator of Inter-American Affairs.

(*e*) Laboratories, Personnel, Training, Supplies: The program has also been strengthened by such general measures as (1) the expansion of all of the Army's diagnostic and sanitary laboratory services; (2) the pro-

curement of additional sanitary engineers, medical entomologists and malariologists and their assignment to stations where the disease is endemic; (3) the training of medical personnel in the control of tropical diseases; (4) long range planning to insure adequate supplies of the drugs and other materials required for the prevention and treatment of malaria, and (5) the initiation of many research projects designed to afford better facilities for the control of malaria.

2. *Intensification of Anti-Mosquito Campaign in Permanent Camps.*—In 1940, careful plans were made to carry out an intensified anti-mosquito campaign in all permanent camps, posts and stations in this country and abroad. When the mobilization of our present Army began it was realized that the rapid induction of large numbers of recruits and their assignment to newly constructed training camps, many of them located in the South, would increase enormously the opportunity for infection with malaria. Army sanitary engineers were assigned to the headquarters of corps areas and the larger camps, and the services of entomologists and malariologists were made available. After completion of preliminary surveys, the mosquito eradication work was started early in the spring of 1941. The campaign was directed at Anopheles control, but some pest mosquito eradication was included. The work in this country was continued throughout the year in the 160 stations indicated in figure 3.

This campaign, in which all of the approved methods of mosquito control were used, was confined to the limits of military reservations, as the United States Public Health Service is responsible for extramilitary sanitation. The cost of the Army program, which was almost 2 million dollars, was amply justified by the relatively low incidence of malaria during this period.

In figure 4 the monthly malaria admission rates per annum for the Army in the continental United States during 1941 and 1942 are superimposed on the rates for corresponding months of 1917 and 1918.

In figure 5 the rates by months for 1941 are compared with the high, low and mean rates by months for the ten peacetime years from 1931 to 1940. The 1941 curve shows a peak in October, which was due to infections contracted by troops while away from their sanitated garrisons on maneuvers, but for the other months the infection rates were relatively low. In spite of the enormous increase in the size of the Army, the annual rate for 1941 was only 1.7 per thousand.

This effective campaign is being continued, and a budget of 5 million dollars has been approved for the fiscal year 1843.

3. *Modification of the Wartime Control Program to Protect Troops Abroad.*—The changing military situation during the last two years has afforded an increasing number of new tropical fronts at which American troops are exposed to malaria. The acquisition of the Caribbean bases from Great Britain early in 1941 expanded our tropical frontiers to include numerous outlying islands. Since the declaration of war last December, our frontiers have been extended still further, and we now have troops located in most of the tropical and semitropical regions of the world. As malaria is the most widespread of all tropical diseases, and one of the most difficult to deal with effectively under wartime field conditions, it has been necessary to modify and further reinforce the Army's control program in order to meet this new situation. Some of the more important features of this altered program are indicated here:

(*a*) The Collection of Data Concerning Malaria in Foreign Countries: In 1940 the Surgeon General started an organization, now a part of the Preventive Medicine Service and designated the Division of Medical Intelligence, for the purpose of collecting specific information about the health facilities and disease hazards of every country in the world. These data are carefully analyzed and incorporated into individual reports, which are used as a basis for specific recommendations made by the Surgeon General for every military force leaving our shores.

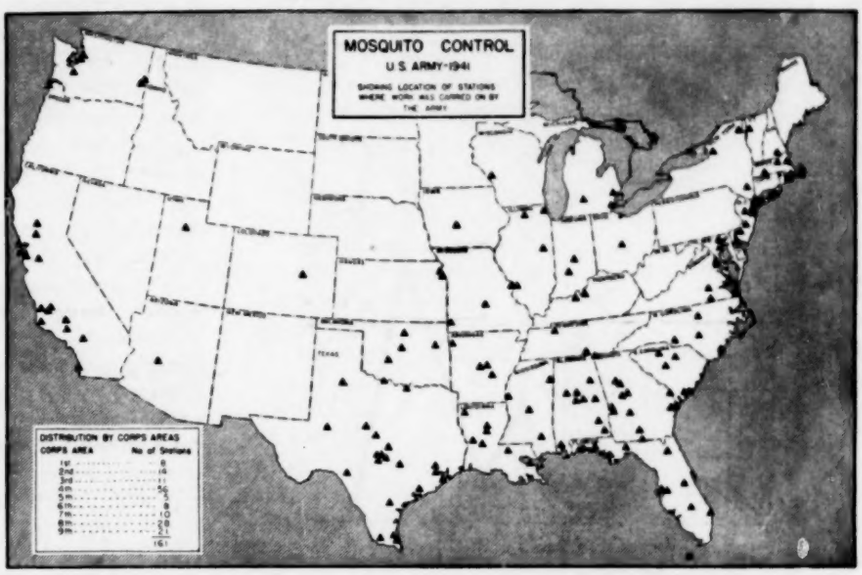

Fig. 3.—Location of mosquito control stations in the continental United States (from U. S. Army Medical Museum negative 73215).

(*b*) Malaria Control in the Caribbean Bases: When our Caribbean bases were acquired from Great Britain, the Surgeon General organized a special health service to assist the Army engineers responsible for their construction. The officers of this service helped in the selection and sanitation of the construction sites and developed medical facilities for the protection of the health of the civilians engaged in the work. Malaria is one of the most important diseases in the Caribbean region, and the problem of its environmental control differs in the individual islands depending on various factors, especially the habits of the local anopheline mosquitoes. In Antigua, for example, the main carriers of malaria are Anopheles albimanus, which breeds in fresh, sunlit, still water, and Anopheles tarsimaculatus, which prefers brackish tidal swamps. In Trinidad, on the other hand, there are about ten other species, and the second most important vector is Anopheles bellator, which breeds in collections of water in a species of air plant, a parasite of the Immortelle tree. Before the military base was constructed in Trinidad medical entomologists were sent there to investigate this mosquito. Within three months Dr. Lloyd Rozeboom of the Johns Hopkins School of Hygiene and Public Health had

incriminated A. bellator as an important carrier of malaria, thus indicating the necessity of eliminating its arboreal breeding places. The effectiveness of this Caribbean health service is indicated by the fact that the health of the personnel stationed at these bases has been excellent in spite of its unusual exposure to malaria and other tropical diseases.

(*c*) Malaria Control Among Troops in the Field: The control of malaria among troops under less permanant field conditions, on many of our other tropical frontiers, is infinitely more difficult, and other methods must be employed. So far as possible the soldier must be protected against (1) mosquito bites, (2) infection if bitten and (3) a possible long and fatal illness if infected. Reliance must be placed on (1) the correct selection of camp sites; (2) the spray-killing of adult mosquitoes with pyrethrum extract; (3) chemoprophylaxis with quinine and atabrine; (4) the use of nets and screens; (5) protective clothing, and (6) the organization and instruction of personnel. Of course, whenever

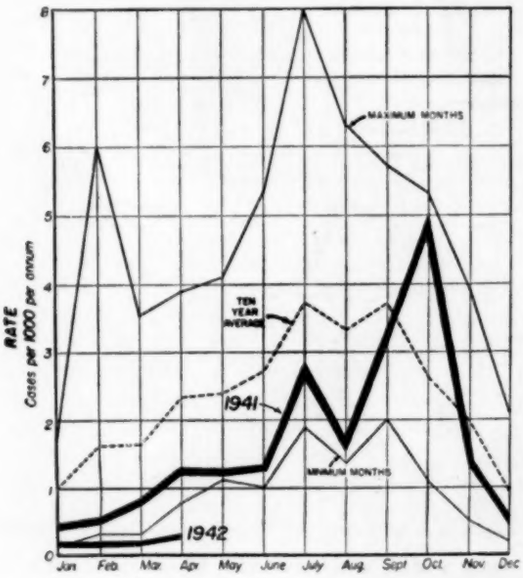

Fig. 5.—Malaria rates in the U. S. Army in the continental United States during 1941 as compared with the ten year average and maximum and minimum months, 1931 to 1940 (from U. S. Army Medical Museum negative 73220).

possible, anti-larval measures should be employed, but in many situations these are impractical because of the movement of troops.

CONCLUSION

It is of vital importance that line officers be alert to the disease hazards confronting their commands, and they must be advised by medical officers equipped with a full knowledge of these diseases. We must have medical officers with our forces who are adequately trained in the epidemiology, control and treatment of malaria. Only by the determined efforts of thoroughly trained officers can we hope to outwit and outfight the mosquito vectors of this disease. You can contribute to the safety of our armed forces by insisting that adequate instruction in tropical medicine be made a basic part of the undergraduate curriculums in every medical school in this country. By so doing you will raise the standard of medical education in America; you will strengthen our wartime defenses against malaria, and you will insure future progress in the Army's fight against this military plague.

Special Article

HANDBOOK OF NUTRITION: VI

PRINCIPAL MINERAL ELEMENTS IN NUTRITION

ICIE G. MACY, PH.D.
DETROIT

These special articles on foods and nutrition have been prepared under the auspices of the Council on Foods and Nutrition. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the Council. These articles will be published later as a Handbook of Nutrition.—ED.

In a consideration of the mineral constituents of the body, one should bear in mind that, while these elements constitute only a small portion of the body weight, they enter into all the activities of the body to a much greater degree than their mere weight would indicate. For many years the important dietary components were stated to be protein, fat and carbohydrate, with slight emphasis placed on water and minerals; later, vitamins were added as necessary adjuncts. In the last few years, however, through voluminous records of physiologic investigations, the mineral elements have come into prominence and are now recognized as essential participants in practically every metabolic process carried on by the body.

The brief summary permitted in this presentation forbids reference to many significant studies of mineral metabolism. For the most part, only studies which contain analyses of food, urine and feces for the seven principal minerals will be used as the basis of the present summary and discussion. This should not be interpreted to mean that investigations involving fewer elements have not contributed to a broader understanding and interpretation of the physiologic behavior of the whole group of elements, but reference to all the excellent reports which have appeared is unnecessary, since recently they have been compiled, integrated and interpreted in monograph form by Shohl [1] and ably summarized and cogently reviewed by Sherman.[2]

For convenience and brevity the discussion is restricted primarily to consideration of the entrance of the principal mineral elements into the body, through the natural foods contained in a well balanced, mixed dietary, their retention and general use in the body and their exit by way of the urine and feces. Special emphasis is given to the interrelationship of the individual inorganic components in the construction and function of healthy tissue structure in infancy, childhood, adult man, pregnancy and lactation. Discussions of the relative values of different foodstuffs as sources of these nutriments will be covered in chapters dealing with the composition of foods and their nutritive value.

MINERAL COMPOSITION OF THE BODY

A large portion of the ash of the body is composed of calcium, magnesium, sodium, potassium, phosphorus, sulfur and chlorine. As these elements comprise from 60 to 80 per cent of all the minerals contained in the body, they may be considered as representing the principal minerals in nutrition. Table 1 illustrates the

1. Shohl, A. T.: Mineral Metabolism, American Chemical Society Monograph Series, New York, Reinhold Publishing Corporation, 1939.
2. Sherman, H. C.: Chemistry of Food and Nutrition, ed. 6, New York, Macmillan Company, 1941.

mineral content of the whole body at different ages. Aging, up to adulthood, is accompanied by an increase in total ash, an increase in percentage of calcium and phosphorus and a decrease in magnesium, sodium, potassium, chlorine and sulfur. In accordance with Moulton's [3] prediction on the chemical composition of man, the ash composition at birth represents approximately 3 per cent of the body weight.

Together with protein, fat, carbohydrate, vitamins and other chemical components, the principal minerals are essential to the structure or function of the body at any age or stage of development. Investigators during the past two decades have emphasized the important physiologic role of the principal minerals as individual entities in nutrition and pointed out that through their interrelationship with one another they may have even greater and far reaching significance in the process of life.

Approximately 99 per cent of the calcium,[2] 70 per cent of the phosphorus and magnesium and some of the sulfur, sodium and chlorine are involved in the construction or functioning of bone, with its cartilaginous organic matrix impregnated with mineral, while considerable quantities of phosphorus, potassium and sulfur are associated with nitrogen in the formation and activities of the muscle, glandular, neural and epithelial tissues. Sodium, potassium and chlorine and to a lesser extent the other elements are held in solution in the

TABLE 1.—*Mineral Composition of the Body* *

Age	Body Weight, Kg.	Total Ash, Gm.	Per Cent of Total Ash							
			Ca	Mg	Na	K	P	Cl	S	Total
Fetus, 6 mos.....	0.88	19	28	0.9	10	7	17	8	8	79
Fetus, 7 mos.....	1.16	30	23	0.8	8	7	14	10	6	69
Newborn.....	2.9	100	24	0.7	5	5	14	5	6	60
Adult.....	70	3,000	39	0.7	2	5	22	3	4	76

* Calculated from values given by Shohl.[1]

body fluids, giving the intracellular and extracellular fluids their vital dynamic characteristics in the regulation of the p_H of the tissues, secretions and excretions, the osmotic pressure, electroneutrality, the distribution of the minerals in the body through the fluids, the irritability of the nerves and contractibility of the muscles, the permeability of the cells and general metabolism. The proper mixture or balance of the salt solutions in the body is of fundamental importance in maintaining the integrity of function of isolated cells and organs.

FOODS AND FEEDING

In order to meet nutritional needs satisfactorily, the consumption of each essential element must be sufficient to cover body losses and to provide a reserve for the formation of new body tissue when needed and for the integration of changing physiologic activities in growth and development. Foods vary in composition, the absolute and relative amounts of minerals in different foodstuffs depending on the kind of soil in which they are grown, climatic conditions, water supply and varying degrees of dehydration due to storage and handling. When the determined chemical composition of a number of foods commonly used in the average American diet, from samples collected under carefully standardized conditions at intervals over a period of seven years, were compared with the most recent summary of food values, the percentage differences of the average determined values from the standard tables varied widely: for some elements less than 3 per cent, for others as much as 200 per cent or more.[4] Because of the variations in the composition of foods and the differences in food habits of people, the body may not receive the proper quota of nutrients, even though the dietary is adequate according to published standards for food values.

The population may be divided into three groups, the well fed, the underfed and the misfed.

The well fed group receives a diet abundant in quantity and composed of a sufficient variety of foods to encompass all the essential food constituents in ample amounts and in desirable proportions to one another. This dietary meets the requirements of producing and maintaining a nutritionally stable body in the most efficient and satisfactory manner. The best diet need not be the most expensive one, as many of our most common and inexpensive foods possess nutritive superiority. The maintenance of a well balanced dietary from day to day is within the economic resources of every one but requires that foodstuffs be selected carefully, intelligently and thriftily to obtain the recognized essential nutrients in the most abundant amounts and most available form and that they be prepared and served in the manner which best preserves their dietetic value and renders them most easily digested and assimilated. An adequate food mixture which is digested readily and utilized satisfactorily is a prerequisite to buoyant health and nutritive success.

The underfed group takes a diet insufficient in quantity to meet the minimal requirements of the body. Such a diet may result from limited economic resources, ignorance, indifference, disease or personal habits. The misfed group, through indifference, ignorance or faddism, chooses an unbalanced diet that will not permit the desirable synergistic effects of the food components during the physiologic processes of digestion and assimilation and subsequent utilization. The malnourished individual who has been underfed uses larger amounts of nutriments when his diet is improved, while the misfed actually may be inhibited from using certain materials until chemical adjustments have taken place within the tissues to a degree that will permit retention. Successful mineral metabolism, therefore, is conditioned by the absolute quantity of the individual minerals in the diet, the relative proportions among them and the inherent physiologic background and make-up of the person consuming the foods.

THE METABOLIC BALANCE

The term metabolic balance has been applied to the procedure of determining the quantitative intake of a food constituent over a given period of time, the corresponding quantitative outgo of that constituent in the feces and urine, and the calculation of the difference between intake and outgo. This difference is arbitrarily designated by the term retention when the intake is larger than the outgo and loss when outgo is larger than intake. While the metabolic balance procedure is a reliable method for observing the retention of minerals by living subjects, difficulties in interpretation arise from the fact that it is impossible to measure directly the loss of water and chemical substances through the skin, and there is no quantitative method of partitioning the fecal content into the amount representing unassimilated food residue, that which is of bacterial or glandular origin,

3. Moulton, C. R.: Age and Chemical Development in Mammals, J. Biol. Chem. **57**: 79-97 (Aug.) 1923.

4. Hummel, Frances C.; Shepherd, Marion L.; Galbraith, Harry; Williams, H. H., and Macy, Icie G.: Chemical Composition of Twenty-Two Common Foods and Comparisons of Analytical with Calculated Values of Diets, J. Nutrition **24**:41-56 (July 10) 1942.

and the amounts which result from direct excretion of products of metabolism into the intestine. Although all these factors must be recognized, the information obtained from metabolic balance investigation has broad application in nutrition and growth and yields valuable information about physiologic changes that occur with administration of specific dietaries and those that characterize certain pathologic states.

MINERAL METABOLIC BALANCES

With the metabolic balance procedure it is possible to determine with a high degree of accuracy the amounts of the principal minerals in the food, urine and feces. However, the retention values which are calculated by deducting the outgo in urine and feces from the food intake, for a definite period of time, are less accurate, since some of the inorganic elements may be excreted through the skin. The magnitude of this recognized inherent error varies with each element, depending on the amount of cutaneous loss. Recorded in the literature are relatively few metabolic balances which have been obtained on healthy individuals under standardized conditions and include simultaneous determinations of the seven electropositive and electronegative minerals.[5] Table 2 presents the average daily intakes and retentions of calcium, magnesium, sodium, potassium, phosphorus, chlorine and sulfur, from studies considered comparable for infancy,[6] childhood,[7] adult man,[8] the last six months of pregnancy [9] and the first three months post partum.[10]

Calcium.—This is the element most likely to be deficient in the American dietary.[11] The lack of sufficient quantities of the mineral may have serious consequence on the longevity and fruition of the race.[2] Ninety-nine per cent of the calcium used by the body is concerned in bone and tooth structure, the remainder with the body fluids and soft tissues. With an average daily calcium intake of 0.72, 0.92 and 0.90 Gm. for infancy (first year of life), childhood (4 to 12 years inclusive) and adult man there were average retentions of 0.14, 0.18 and 0.15 Gm., respectively.

An individual experiencing rapid skeletal growth, having augmented physiologic demands or possessing a subnormal concentration of calcium in the bony tissue may require larger amounts of calcium in proportion to the need to develop a satisfactory physiologic state. Table 2 evidences that the amount of calcium required increases with age, growth and other physiologic demands, that of pregnancy requiring the greatest amount. During the last half of pregnancy, which is generally accompanied by increased food consumption,[12] the calcium retained is used in repleting the maternal bodily stores and in building new maternal tissues, to meet the increasing demands of the parasitic fetus, the losses accompanying parturition, and in preparation of the maternal body to meet postpartum physiologic readjustment and the establishment of milk flow.[13] A temporary increase in retention may follow an increased intake, whereas a change in dietary calcium to a level lower than before may in itself induce a negative balance. It is known that some of the adult men whose balances are reported were on a low calcium diet preceding the experimental studies;[8] perhaps this accounts for the comparatively large average daily calcium retention for men.

Individuals vary in their ability to utilize the calcium of their foods. Indeed, Mitchell, Outhouse and their co-workers [14] have emphasized that it is as necessary to know how well a person utilizes the calcium of the food which he eats as it is to know the actual calcium content of those foods. They found that preschool children and adults were able to use only one fifth to one fourth of the calcium in milk, but there were variations in the ability of the different individuals to use the calcium supplied. Certain vegetables tend to depress calcium utilization.[15] The presence of vitamins C and D in the diet is essential in calcium utilization; similarly there are optimal levels of phosphorus and fat intakes, in relation to the calcium consumed, which permit the calcium to be more completely utilized.

5. Many of the terms used by Shohl [1] in his attempt to clarify and to use specific terminology in that phase of nutrition dealing with mineral metabolism have been adopted.

6. Swanson, W. W.: The Composition of Growth: II. The Full Term Infant, Am. J. Dis. Child. **43:** 10-18 (Jan.) 1932. Schlutz, F. W.; Morse, Minerva, and Oldham, Helen: Vegetable Feeding in the Young Infant: Influence on Gastrointestinal Motility and Mineral Retention, ibid. **46:** 757-774 (Oct.) 1933.

7. The average daily mineral balances have been taken from the mineral balance data recently published (Macy, Icie G.: Nutrition and Chemical Growth in Childhood: I. Evaluation, Springfield, Ill., Charles C Thomas, Publisher, 1942). Since the data were accumulated on 29 healthy children aged 4 to 12 years under comparable experimental conditions during five hundred and ninety-three five day periods (representing two thousand, nine hundred and sixty-five experimental days) they have been used primarily in tracing out the various paths and functions of the individual mineral elements and the total electropositive and total electronegative minerals in metabolism. The subjects received balanced diets containing ample amounts of minerals, vitamins and other essential nutriments. These longitudinal data are more reliable than cross sectional data, since they encompass patterns of increment and rates of growth during consecutive intervals and at different ages. Dearborn and Rothney (Predicting the Child's Development, Cambridge, Mass., Sci-Art Publishers, 1941, p. 147) have estimated that, in the case of standing height, the available longitudinal data on only 248 cases represent the equivalent of cross sectional measurements on 270,000 cases; Wilson (Heights and Weights of Two Hundred and Seventy-Five Public School Girls for Consecutive Ages of 7 to 16 Years Inclusive, Proc. Nat. Acad. Sc. **21:** 633, 1935) made similar estimates. Indeed, it has been estimated that oxygen consumption and heat production measurements made on each of 10 children once a year for sixteen years, a total of one hundred and sixty observations, would give as much information about the way children grow, or more, than one observation on each of 2,500 children (Talbot, F. B.; Wilson, E. B., and Worcester, Jane: Basal Metabolism of Girls: Physiologic Background and Application of Standards, Am. J. Dis. Child. **53:** 273-347 [Jan.] 1937). Although the values for the different age groups are indicated in the original (Nutrition and Chemical Growth in Childhood: I), for this discussion I have considered only the average figures for childhood, ages 4 to 12 inclusive; to consider the individual age groups would lead to a consideration of chemical growth, which is the subject of a treatise now in preparation (Macy, Icie G.: Nutrition and Chemical Growth of Children: II. Interpretation, to be published).

8. Clark, G. W.: Studies in the Mineral Metabolism of Adult Man, University of California Publications in Physiology, Berkeley, University of California Press, 1926, vol. 5, pp. 195-287.

9. Coons, Callie M.; Schiefelbusch, Anna T.; Marshall, Gladys B., and Coons, R. R.: Studies in Metabolism During Pregnancy, Experiment Station Bulletin 223, Oklahoma Agricultural and Mechanical College, Stillwater, 1935. Hummel, Frances C.; Hunscher, Helen A.; Bates, Mary F.; Bonner, Priscilla; Macy, Icie G., and Johnston, J. A.: A Consideration of the Nutritive State in the Metabolism of Women During Pregnancy, J. Nutrition **13:** 263-278 (March) 1937. Hummel, Sternberger, Hunscher and Macy.[10]

10. Hummel, Frances C.; Sternberger, Helen R.; Hunscher, Helen A., and Macy, Icie G.: Metabolism of Women During the Reproductive Cycle: VII. Utilization of Inorganic Elements (A Continuous Case Study of a Multipara), J. Nutrition **11:** 235-255 (March) 1936.

11. Sherman, H. C.: Calcium Requirement of Maintenance in Man, J. Biol. Chem. **44:** 21-27 (Oct.) 1920. Stiebeling, Hazel K.; Monroe, Day; Coons, Callie M.; Philpard, Esther F., and Clark, Faith: Family Food Consumption and Dietary Levels, Miscellaneous Publication 405, U. S. Dept. Agri., 1941.

12. Sukers, C. F.; Macy, Icie G.; Donelson, Eva; Nims, Betty, and Hunscher, Helen A.: Food Intake in Pregnancy, Lactation and Reproductive Rest in the Human Mother, J. Nutrition **4:** 399-410 (Sept.) 1931.

13. Hunscher, Helen A.: Metabolism of Women During the Reproductive Cycle: II. Calcium and Phosphorus Utilization in Two Successive Lactation Periods, J. Biol. Chem. **86:** 37-57 (March) 1930. Macy, Icie G.; Hunscher, Helen A.; McCosh, Sylvia S., and Nims, Betty: Metabolism of Women During the Reproductive Cycle: III. Calcium, Phosphorus and Nitrogen Utilization in Lactation Before and After Supplementing the Usual Home Diets with Cod Liver Oil and Yeast, ibid. **86:** 59-74 (March) 1930. Donelson, Eva; Nims, Betty; Hunscher, Helen A., and Macy, Icie G.: Metabolism of Women During the Reproductive Cycle: IV. Calcium and Phosphorus Utilization in Late Lactation and During Subsequent Reproductive Rest, ibid. **91:** 675-686 (May) 1931.

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Calcium is largely excreted through the bowel. In the studies of normal children an average of 13 per cent of the mean daily outgo was eliminated through the kidneys and 87 per cent by way of the bowel. In terms of the calcium intake the mean excretion in urine and in feces amounted to 10 and 70 per cent, respectively, with a retention of 20 per cent. With an average daily intake of 0.92 Gm. (46 milliequivalents) of calcium, 0.74 Gm. (37 mEq.) was excreted by the kidney and bowel and only 0.18 Gm. (9 mEq.) was retained.

Neither the most satisfactory level of calcium intake nor the optimal retention of calcium at any physiologic age or stage of man's development is known. Sherman and his students [16] have shown that the calcium content of rat bodies at various ages was measurably influenced by the level of intake. To what extent such differences exist among human subjects remains to be determined.[17] Perhaps the high vitamin content of the generous mixed dietaries, the healthy condition of the children and well filled body stores of calcium account for the mean daily calcium retention of 7.9 ± 6.8 mg. per kilogram of body weight by the subjects, in contrast to the 10 and 12 mg. estimated by Sherman [2] Shohl [1] and others.[18] Perhaps the average run of children who grow up under less favorable conditions would need to store 10 to 12 mg. per kilogram daily in order to attain optimal physiologic well-being. An average daily retention of 1 mg. per kilogram of body weight for adult man and 9 mg. during pregnancy are representative of the physiologic performance of the average healthy person.

There are numerous factors influencing the amount of calcium that the body may retain, for example physical and emotional activity, either directly or indirectly reflected through the gastrointestinal tract. Indeed, emotional disturbances may affect the elimination rate of both the kidneys and the bowels.[19] A more rapid laxation rate (bowel movements per day) may stimulate a greater excretion of calcium through the feces.

Phosphorus.—Phosphorus is widely distributed in the body, combined in many forms in soft and hard tissues and associated with protein, carbohydrate, fat, various minerals and organic substances. Seventy per cent of the retained phosphorus combines with calcium, while nitrogen combines with the remaining 30 per cent. Phosphorus is essential in the metabolism of fats and carbohydrates, and participates in many phases of metabolism and in the regulation of the proper hydrogen ion concentration in the tissues, the secretions and excretions of the body. The form in which phosphorus is taken may have an important bearing on its nutritive value in the diet.[20]

The average daily retention of phosphorus is increased from 99 mg. in infancy to 264 mg. by the twelfth year (table 2). In contrast to the 70 per cent average loss of calcium intake through the alimentary canal, only 31 per cent of the phosphorus intake was lost by that route. Fifty-five per cent of the phosphorus intake was excreted in the urine; 14 per cent was retained. The feces contained 29 to 40 per cent of the phosphorus outgo, and the remaining 60 to 70 per cent was lost from the body as metabolites in the urine. In the normal children, with an average daily phosphorus intake of 1250 ± 294 mg. (72.8 mEq.), 684 ± 152 mg. (39.8 mEq.) was excreted in the urine and 393 ± 112 mg. (22.9 mEq.) in the feces; 173 ± 175 mg. (10.1 mEq.) was retained.

TABLE 2.—*Metabolic Balances (Milligrams per Day)*

	Electropositive Minerals								Electronegative Minerals					
	Calcium		Magnesium		Sodium		Potassium		Phosphorus		Chlorine		Sulfur	
	Intake	Retention	Intake	Retention	Intake	Retention	Intake	Retention	Intake	Retention	Intake	Retention	Intake	Retention
Infancy *	721	138	97	8	322	69	1,016	115	558	99	709	108	160	8
Childhood †														
4 - 6 yrs.	841	170	286	44	2,133	206	2,598	182	1,141	156	3,382	250	686	58
7 - 9 yrs.	1,100	168	312	53	2,556	286	3,004	258	1,424	183	3,909	323	835	66
10 -12 yrs.	1,100	300	334	50	3,011	443	3,530	284	1,627	264	4,404	366	1,016	144
Adult man ‡	901	151	284	—19	3,795	1,382	2,486	188	1,492	279	5,073	1,063	919	170
Pregnancy §	2,153	453	461	78	4,242	645	4,760	639	2,077	276	5,804	436	1,102	205
Lactation #	2,578	—68	525	—10	3,950	334	5,518	526	2,366	—108	6,179	140	1,210	—16

* First year of life (Swanson.[6] Schlutz.[6]).
† Ages 4 to 12 years (Macy: Nutrition and Chemical Growth in Childhood: I. Evaluation [7]).
‡ Adult man.[8]
§ Last half.[9]
# First three months (Hummel, Sternberger, Hunscher and Macy.[10] Hummel, Hunscher, Bates, Bonner, Macy and Johnston.[9] Unpublished [10]): The balances obtained with lactating women are calculated by subtracting from the intake the outgo in urine, feces and breast milk. Only a small number of balances are available, and these demonstrate wide variations in mineral retention, ranging for calcium from an average of 343 mg. daily to an average loss of 480 mg. a day.

Phosphorus is needed in relatively large quantities during growth because it is used so universally in the construction of skeletal, nervous and muscle tissues. Assuming that a relationship exists between body weight and phosphorus retention, during childhood when the average daily phosphorus intake amounted to 55 mg. per kilogram of body weight, the average daily retention was 7 to 8 mg. During periods when the maternal body was being prepared to take care of the increasing demands of pregnancy, parturition and the establishment of lactation, average daily intakes of 36 mg. of phosphorus per kilogram of body weight resulted in average retentions of 4 mg. Adult man consumed, on the average, 11 mg. of phosphorus per kilogram of body weight daily, of which 2 mg. was retained.

The calcium to phosphorus ratio in the food intake has an important bearing on metabolism of both these elements.[21] Phosphorus fed in excessive amounts causes a corresponding excretion of calcium in the feces; similarly, an increased intake of calcium leads to a greater outgo of phosphorus. On a unit weight basis, with a mean daily calcium : phosphorus ratio of 1 : 1.4 in the

16. Sherman, H. C., and Booher, Lela E.: The Calcium Content of the Body in Relation to That of the Food, J. Biol. Chem. **93:** 93-103 (Sept.) 1931. Campbell, H. L.; Bessey, O. A., and Sherman, H. C.: Adult Rats of Low Calcium Content, ibid. **110:** 703-706 (Aug.) 1935. Toepfer, E. W., and Sherman, H. C.: The Effect of Liberal Intakes of Calcium or Calcium and Phosphorus on Growth and Body Calcium, ibid. **115:** 685-694 (Oct.) 1936.
17. Shohl.[1] Sherman.[2] Leitch.[18]
18. Leitch, I.: The Determination of the Calcium Requirements of Man, Nutrition Abstr. & Rev. **6:** 553-578 (Jan.) 1937.
19. Cannon, W. B.: Bodily Changes in Pain, Hunger, Fear and Rage, ed. 2, New York, D. Appleton-Century Company, 1936.
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21. Stearns, Genevieve: The Mineral Metabolism of Normal Infants, Physiol. Rev. **19:** 415-438 (July) 1939. Shohl.[1] Sherman.[2]

food intake during childhood the mean ratio was 1:7.1 in the urine, 1.6:1 in the feces and 1.0:1 in the retention. For the data compiled from the literature and presented in table 2, the mean calcium:phosphorus ratios for the food intakes and retentions are presented in table 3. Since magnesium may replace some of the calcium required in metabolism, the calcium: magnesium ratios are also given.

Not only is it essential to have liberal amounts of calcium and phosphorus in the diet, but these must be in the proper relationship to one another and be accompanied with a generous supply of vitamin D if skeletal tissue is to be constructed and maintained in a satisfactory manner.[22] An inadequate and unbalanced diet with respect to calcium and phosphorus may result in rickets in the infant, calcium poor skeletal growth and possibly rickets in childhood, and osteoporosis or osteomalacia leading to fragility of bones in the adult. The severity of these conditions may be determined chemically by studies of the calcium and phosphorus content of the blood and clinically by roentgenograms of the bones.

Mellanby,[23] Schour and his co-workers [24] and Swanson [25] in teeth and Sontag [26] in the bones of infants have shown that these tissues during formation are extremely sensitive to variations in metabolic processes, the alterations in internal environment of the body being recorded in the incremental layers, or rings, developing at the time. Environmental variations due to disease, to calcium and to vitamin C and D deficient dietaries affect the layers or rings formed at the time they occur. Whether dental caries is related to mineral metabolism remains questionable.[27]

TABLE 3.—*Calcium to Phosphorus and Calcium to Magnesium Ratios* *

	Ca : P		Ca : Mg	
	Intake	Retention	Intake	Retention
Infancy	1.3	1.4	7.4	17.2
Children				
4 - 6 years	0.7	1.1	2.9	3.9
7 - 9 years	0.8	0.9	3.5	3.2
10 -12 years	0.7	1.1	3.3	6.0
Adult man	0.6	0.5	3.2	...
Pregnancy	1.0	1.6	4.7	5.8
Lactation	1.1	...	4.9	...

* Based on values in grams.

In general, an increase in calcium intake usually results in increased retention, but by a decreased percentage of the calcium intake retained. The calcium: phosphorus ratio of the retention alters with age; young children retain more calcium in relation to their phosphorus retentions. The calcium:phosphorus ratio in the food also changes, as milk is supplemented with other foods (table 3). The variations in the composition of foods must be recognized, since the interrelationships among the quantities of minerals may be as important as or more important than the actual amounts of the single elements.

The body may not retain exactly what it needs and reject all other material, for it has great ability, known as homeostasis, to rearrange and adjust materials which it already possesses to meet current needs. An outstanding illustration of this capacity of the body is the mobilization of calcium from the long bones in the healing of rickets and, during gestation, to meet the needs of the fetus. It is obvious that some of the calcium and phosphorus constituting bone must be regarded as a reserve supply of calcium and phosphorus.[1] Moreover, the great flux of minerals in the blood, lymph, intracellular and extracellular fluids and the various secretions, such as saliva, gastric juice, bile and intestinal secretions, are in effect mineral reserves. Under conditions of ample intake there is a large storage of calcium during the last three months of pregnancy, but when the diet is inadequate in quantity and quality the demand exceeds the supply, and without the mobile reserves in the maternal bones the fetal demands could not be met.[28] Indeed, in many cases in which mothers are either underfed or misfed, both the mother and the fetus suffer severe consequences, depending on the extent of the dietary inadequacy and the degree of maternal reserves present.[29]

It is now generally recognized that, although the feces do contain some material which has not been absorbed, they also contain material which has been absorbed and subsequently excreted into the alimentary tract. Large quantities of calcium in the food carry through the tract a large portion of the phosphorus which is ingested. A large intake of calcium may, in addition, cause phosphorus which previously has been absorbed, to leave the body by way of the feces rather than in the urine. Excess fat appearing in the feces in the form of soaps may likewise rob the body of calcium and other bases. It has been shown that under some conditions more calcium may be present in the feces than was ingested as food, which proves that some calcium must have been excreted into the intestine. Under long periods of inadequate calcium consumption the homeostatic capacity of the body is brought into play, and the body develops a characteristic ability for conservation of this element in its attempt to maintain physiologic functions compatible with life.[30] It is not possible at the present time to decide whether changes in metabolism of certain minerals such as calcium and phosphorus, which result in a greater or smaller amount being present in the serum or deposited in the tissues, depend on more effective absorption, increased excretion or improved deposition in the tissues.

Magnesium.—In certain instances magnesium apparently has the ability to replace some calcium. About three fourths of the magnesium in the body is associated

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27. Boyd, J. D.; Drain, C. L., and Stearns, Genevieve: Metabolic Studies of Children with Dental Caries, J. Biol. Chem. **103**: 327-337 (Dec.) 1933. Schour, Isaac: Calcium Metabolism and Teeth, J. A. M. A. **110**: 870-877 (March 19) 1938.

28. Bauer, Walter; Albright, Fuller, and Aub, J. C.: Studies of Calcium and Phosphorus: II. The Calcium Excretion of Normal Individuals on a Low Calcium Diet, Also Data on a Case of Pregnancy, J. Clin. Investigation **7**: 75-96 (April) 1929.

29. Ebbs, J. H.; Tisdall, F. F., and Scott, W. A.: The Influence of Prenatal Diet on the Mother and Child, J. Nutrition **22**: 515-526 (Nov.) 1941.

30. Nicholls, Lucius, and Nimalasuriya, Ananda: Adaptation to a Low Calcium Intake in Reference to the Calcium Requirements of a Tropical Population, J. Nutrition **18**: 563-577 (Dec.) 1939.

with calcium in skeletal formation, and the remainder is present in the soft tissue and body fluids. Knowledge of its specific function in human nutrition is meager. Perhaps one of its most important functions in the body is serving in combination with organic radicals to form organometallic compounds [31] which serve as catalysts in physiologic activities. Certainly the actual retention of magnesium by the body at any age is very small (table 2).

Like calcium, magnesium is excreted largely by way of the intestine. With children, of an average daily magnesium excretion of 250 mg. only 35 per cent appeared in the urine and 65 per cent in the feces. Some of the erratic results obtained in metabolic studies may be due in part to unsatisfactory chemical procedures not generally recognized, for iron and other minerals are known to interfere with the accurate determination of magnesium in biologic materials. Using technics assuring accuracy of determination, the mean daily intake of magnesium during childhood amounted to 297 ± 42 mg. (24.4 mEq.), of which 88 ± 18 mg. (7.2 mEq.) and 162 ± 39 mg. (13.3 mEq.) were excreted in the urine and feces, respectively, and 47 ± 47 mg. (3.9 mEq.) was retained. An average of 16 per cent of the intake of magnesium was retained. Assuming a relationship of magnesium retention to body mass, with an average intake of 13 mg. per kilogram of body weight in children, an average daily retention of 2 mg. per kilogram occurred. In pregnancy an average of only 1.3 mg. of magnesium per unit weight was retained, while there was practically an equilibrium in adult man.

Magnesium, calcium and phosphorus balances represent true values, since authoritative evidence [32] indicates that no appreciable amounts of these substances are excreted through the skin.

Sulfur.—A nutritionally essential element, sulfur has a far reaching significance in the body. It is a component of glutathione, insulin, thiamine and the organic matrix of the bone. Sulfur and nitrogen metabolism are closely related in protein metabolism. Only two naturally occurring sulfur containing amino acids (cystine and methionine) are known, and they account for a large portion of the sulfur consumed and utilized in the processes of metabolism. In previous studies of sulfur metabolism more emphasis has been placed on the sulfur partition in urine than on the balance between intake and outgo, especially in investigations with children.

In the studies reported for childhood the mean daily sulfur intake was 750 ± 130 mg.; of this amount 79 per cent (593 ± 104 mg.) was lost in the urine, 12 per cent (89 ± 26 mg.) in the feces, and 9 per cent (68 ± 90 mg.) was retained. Wide variations in the metabolism of sulfur are evidenced by the large standard deviation for the retention. These may be attributable to the fact that sulfur exists in several forms in the body, and the retention value includes any cutaneous loss of sulfur, which has been shown to be 60 to 106 mg. of sulfate sulfur daily in adult man.[33]

The average daily sulfur retention is increased with age from 8 mg. in infancy to 144 mg. for the 10 to 12 year group. In pregnancy there is an average storage of 205 mg. of sulfur daily, but a loss may occur post partum (table 2). If, in man, one deducts the possible loss of sulfur through the skin, there is still a considerable storage of sulfur. In the men who provided the data considered in this review, nutritional status improved during the investigation; [8] therefore it is possible that considerable sulfur was used in repair of old and building up of new tissue. It is possible also that there was a greater cutaneous loss of sulfur, since the experimental subjects were quite active during the investigation.

Assuming a relationship between body weight and sulfur retention, with an average daily intake of 34.2 mg. of sulfur per kilogram of body weight at the 4 to 6 year level in childhood, there was a storage of 2.8 mg.; at the 10 to 12 year level, the sulfur intake amounted to 28.8 mg. and the retention 4.1 mg. per kilogram of body weight daily. On a unit weight basis, adult man retained an average of only 1 mg. of sulfur per kilogram of body weight and during the last half of pregnancy the average daily sulfur intake approximated 20 mg. and the average retention 5 mg. per kilogram of body weight daily. Recognizing the possible cutaneous losses, these results are in keeping with our present knowledge of physiologic changes that take place: in normal pregnancy there is building of new tissue in the maternal body, in the enlargement of the uterus, in the mammary glands and in the body generally to take care of the augmented needs during labor and the losses during parturition and during the early days post partum; in lactation there is the physiologic readjustment of the body in the establishment of lactation, accompanied by the losses occurring with the involution of the uterus and other body organs and reserves.

Potassium.—By virtue of its activity in relation to cellular water, potassium is associated with nitrogen metabolism. When new protoplasmic tissue is being formed, potassium is retained in sufficient quantities to meet the intracellular fluid needs of the newly formed cells. This alkaline mineral is held within the cells, although what activates and regulates its entrance into and its egress from the cells is not completely understood.[1] Irritability of the nervous system is dependent in large measure on the balance between calcium, potassium and sodium ions present in the tissues and the body fluids. A decided decrease in calcium increases irritability, and an increase in potassium will cause a similar effect. The proper mixture or balance among the salt solutions of the body is of fundamental importance for the maintenance of the integrity of function of cells and organs. The mobility and activity of the ions as they participate in the physiologic activity of maintaining electroneutrality and the distribution of minerals in bodily function are covered by another author.

There is an increased storage of potassium as growth proceeds. With average intakes of 1,016 and 2,776 mg. of potassium in infancy and childhood there were mean daily retentions of 115 and 209 mg., respectively (table 2). Both pregnancy and lactation are accompanied by large potassium retention, averaging 639 and 526 mg. daily, respectively. Adult man stores only a small quantity, 188 mg. daily. On a unit weight basis

31. Gilman, Henry: Some Biological Applications of Organometallic Compounds, Science **93**: 47-53 (Jan. 17) 1941.
32. Swanson, W. W., and Iob, L. V.: Loss of Minerals Through the Skin of Infants, Am. J. Dis. Child. **45**: 1036-1039 (May) 1933. Freyberg and Grant.[33]
33. Freyberg, R. H., and Grant, R. L.: Loss of Minerals Through the Skin of Normal Humans When Sweating is Avoided, J. Clin. Investigation **16**: 729-731 (Sept.) 1937.

the retensions of potassium for adult man and women in pregnancy amount to 1 and 9 mg. per kilogram of body weight a day, respectively.

An average of 79 per cent of the intake of potassium was excreted by the kidneys, 13 per cent was excreted by the bowel and less than 8 per cent was retained in childhood. Of the mean daily intake of 2,776 ± 437 mg. (71.0 mEq.), 2,191 ± 405 mg. (56.0 mEq.) appeared in the urine, 376 ± 136 mg. (9.7 mEq.) appeared in the feces and 209 ± 268 mg. (5.3 mEq.) was retained. The large standard deviations accompanying these values illustrate wide differences in physiologic performance among individuals. The retention, which includes the cutaneous potassium loss, which may reach as much as 30 to 38 per cent, also evidences the approximate nature of these balances. If, however, 30 per cent of the retention value was lost through the skin, approximately 146 mg. of potassium was retained by the children daily to meet body needs for growth and function.

Sodium.—Although some serves as a part of the structure of the cartilage and muscle cells, sodium is associated with the blood plasma and the extracellular fluids. It functions largely with chloride and bicarbonate in control of the osmotic pressure and ionic equilibrium or electroneutrality of the body fluids and tissues. Considerably more sodium than potassium is needed in the body. The average daily retentions of sodium as determined for infancy, childhood and adult man amounted to 69, 246 and 1,382 mg. daily, respectively. Of the total sodium excretion, 98 per cent may be eliminated in the urine and 2 per cent in the feces. This is to be expected, since sodium is the most predominant positive mineral element in the extracellular fluids, circulates throughout the entire body and serves generally in the metabolic processes of the body in connection with the maintenance of electroneutrality.

The actual requirements of sodium and potassium are comparatively small, but the ratio between these two elements in the diet is considered of great practical importance. The high proportion of potassium to sodium in most common foods introduces two possible dangers, which may be evidenced metabolically by preventing full utilization of the sodium or by causing insufficient assimilation and utilization of other elements, especially calcium and phosphorus. Therefore, to compensate for the excess of potassium over sodium in foods and to enhance palatability, table salt is added to many foods incorporated in the daily diet. The body has a unique ability to conserve sodium in times of shortage and to absorb and distribute sodium rapidly when it is introduced into the body.

The mean daily intake of sodium by 29 children averaged 2,310 ± 368 mg. (100.5 mEq.), of which 787 mg. was given in chemically pure sodium chloride. The average daily excretion of sodium in the urine amounted to 2,022 ± 377 mg. (88.0 mEq.), while a small but significant quantity (42 ± 39 mg., or 1.8 mEq.) was eliminated through the alimentary canal, and 246 ± 280 mg. (10.7 meq.) was retained. Assuming that 12 per cent of the retained sodium was dissipated through the skin,[33] the true mean daily retention of the children was 216 mg.

Chlorine.—A component of all body secretions and excretions, chlorine is stored only to a limited extent, in the skin and subcutaneous tissue and in the skeleton. The chlorides of the blood, particularly sodium chloride, compose about two thirds of the blood anions. They play an essential role in maintaining electroneutrality within the body and serve in large measure to maintain the osmotic pressure of the extracellular fluids. Gastric secretion contains chlorine in free hydrochloric acid and combined in salts. Chlorine, like sodium and potassium, is lost through the skin to the extent of about one fifth of that retained;[32] hence the retentions in the metabolic balances presented in table 2 are exaggerated by that amount.

The average daily retentions of chlorine for infants, children and man amount to approximately 108, 277 and 1,063 mg., respectively. Ninety-one per cent of the chlorine intake is eliminated through the urinary tract and only 1 per cent through the bowel. In children whose sodium chloride intake was controlled, the mean daily chlorine intake was 3,596 ± 460 mg. (101.4 mEq.), of which 3,265 ± 467 mg. (92.1 mEq.) was excreted in the urine, 54 ± 33 mg. (1.5 mEq.) was excreted in the feces and 277 ± 241 mg. (7.8 mEq.) was retained. Assuming that one fifth of the retention value represents cutaneous losses, the true retention value would be 222 mg. of chlorine per day.

Human dietaries usually contain considerable quantities of sodium, potassium and chlorine and it is only during diarrhea, excess sweating and certain endocrine disturbances and metabolic conditions that an additional intake of these elements is required. Under ordinary conditions the body can adapt itself to shortages of these elements,[34] and it is generally assumed that a diet which is adequate in all other respects will contain amounts sufficient to meet the nutritive demands. It is recognized, however, that the adjustment of the body to a change in level of intake of sodium, and of potassium in particular, requires longer than the conventional week or ten days, and that excessive proportions of potassium in diets may prevent full utilization of sodium by the organism and may cause insufficient utilization of calcium and phosphorus.

Minerals are lost from the body during acidosis. The growing child is particularly prone to acidosis, especially when consuming high fat diets. In a controlled metabolic balance study which included the determination of the seven positive and negative minerals and nitrogen Sawyer, Baumann and Stevens[35] observed 2 children aged 5 and 8 years during the consumption of a normal diet and subsequently when the lactose and sugar of the normal period were replaced by an isodynamic quantity of pure butter fat, the mineral, nitrogen and calory intakes remaining the same during the two observation periods. The high fat diet caused increased acid production in the body, which resulted in increased elimination of nitrogen, sulfur, calcium, magnesium, phosphorus, sodium, potassium and chlorine. It is assumed that the nitrogen and sulfur were derived from catabolized muscle; calcium, phosphorus and magnesium were of skeletal origin, and sodium, chlorine and potassium were obtained from body fluids. The losses, particularly calcium and phosphorus, varied directly with the severity of acidosis.

34. Osborne, T. B., and Mendel, L. B.: The Inorganic Elements in Nutrition, J. Biol. Chem. **34**: 131-139 (April) 1918.

35. Sawyer, Margaret; Baumann, L., and Stevens, F.: Studies of Acid Production: II. The Mineral Loss During Acidosis, J. Biol. Chem. **33**: 103-109 (Jan.) 1918.

POSITIVE AND NEGATIVE MINERAL BALANCES

The electropositive minerals (calcium, magnesium, sodium and potassium) and electronegative minerals (phosphorus, sulfur and chlorine) serve singly and in combination in the physiologic structure and function of the body. As food burns in the body, the organic anions, citrates, acetates and so on are completely oxidized, all of the positive mineral elements and the negative element chlorine are released, and the negative minerals sulfur and phosphorus are generally assumed to be completely oxidized to phosphates and sulfates. However, the anion values of sulfur and phosphorus retained in the body may have several valences, since they enter into combination with other elements to form many different compounds. In calculating, the average valence of 1.8 has been assigned to phosphorus and a valence of 2 to sulfur.[36]

TABLE 4.—*Metabolic Mineral Balances* (Milliequivalents per Day)*

	Total Positive Minerals		Total Negative Minerals		Total Minerals		Excess Positive Minerals	
	Intake	Retention	Intake	Retention	Intake	Retention	Intake	Retention
Infancy.....	84	13	62	9	146	22	22	4
Children								
4 - 6 yrs.....	225	26	204	20	429	46	21	6
7 - 9 yrs.....	269	32	245	24	514	56	24	8
11 -12 yrs.....	363	45	282	35	585	80	21	10
Adult man.....	297	72	287	58	584	130	10	14
Pregnancy.....	452	73	353	41	805	114	99	32
Lactation †.....	485	24	387	—3	872	21	98	27
Average Daily per Kilogram of Body Weight								
Children								
4 - 6 yrs.....	11.2	1.3	10.2	1.0	21.4	2.3	1.0	0.3
7 - 9 yrs.....	10.1	1.2	9.2	0.9	19.3	2.1	0.9	0.3
11 -12 yrs.....	8.6	1.3	8.0	1.0	16.6	2.3	0.6	0.3
Adult man.....	2.1	0.5	2.0	0.4	4.1	0.9	0.1	0.1
Pregnancy.....	7.2	1.0	5.8	0.6	13.0	1.6	1.4	0.4
Lactation †.....	8.3	0.5	6.7	—0.02	15.0	0.5	1.6	0.5

* A valence of 1.8 has been used for phosphorus and 2 for sulfur, although it is recognized that these are only approximations. No deductions have been made for cutaneous losses.

† Retentions were calculated as intake minus outgo in urine, feces and breast milk.

During growth and body repair there is an accumulation of both positive and negative minerals in the tissues, the total amount depending on the intensity of the physiologic processes. The relationship between the gross amounts of positive and negative minerals retained is determined by the relative demands for materials with which to construct hard and soft tissue and by the cutaneous losses of potassium, sodium, chloride and sulfur. Table 4 presents the average intakes and retentions of the total positive minerals, total negative minerals, total positive plus negative minerals and excess of positive minerals for infancy, childhood, adult man, pregnancy and lactation.

Skeletal tissue synthesis creates a demand for positive minerals; soft tissue construction requires a preponderance of negative minerals; therefore increased retentions of positive minerals in relation to negative minerals indicates an impetus to skeletal construction, and the reverse shows an emphasis on soft tissue formation. The retention of positive, negative and total minerals is increased from infancy through childhood to adulthood, but the average daily retentions per kilogram of body weight decrease. While pregnancy demonstrates augmented metabolic demands for all minerals, metabolic balances concurrent with early lactation may demonstrate a loss of negative minerals commensurate with the tissue involution taking place in the uterus and other maternal organs and the peculiar physiologic demands of lactation. When considered on a unit weight basis, growth and pregnancy are accompanied by a retention of total minerals and excess positive minerals, but during lactation these occur to a lesser extent than in adult man. A retention of total minerals is one of the best criteria that growth, repair or repletion are taking place.

The positive and negative minerals constitute approximately 25 per cent of the total urinary solids of children. Although the diet may be constant in quantity and quality, the amounts of positive and negative minerals excreted from day to day depend on current metabolic demands for growth or maintenance. An average of 156 mEq. of mineral cations and 169 mEq. of mineral anions were excreted in urine by normal children. These, together with the nonmineral cation NH_4^+, the titrable acidity and the organic acids, determine the acidity or alkalinity of the urine. In the feces of the children, the positive and negative minerals together composed approximately 10 per cent of the total fecal solids. An average of about 7 per cent of the total weight of the fecal solids consisted of positive minerals. Calcium, magnesium, potassium and phosphorus compose the greater part of the minerals eliminated in the feces, but relatively small amounts of sodium, sulfur and chlorine are present.

The electropositive minerals (calcium, magnesium, sodium and potassium) are especially important in skeletal formation, particularly calcium and magnesium, in nervous and muscular activity and blood coagulation. Sodium and potassium participate in the control of body water as well as in other structural and functional activities. In childhood the average daily positive mineral content of the diets was 242 ± 40 mEq., of which 29 ± 22 mEq. was retained. The average daily positive mineral content of the feces was 57 ± 14 mEq., 56 per cent of which was calcium. The average daily consumption of positive minerals per kilogram of body weight was 10.7 ± 1.6 mEq. On the same basis 6.9 ± 1.0 mEq. was excreted in the urine, 2.5 ± 0.7 mEq. was eliminated in the feces and 1.3 ± 0.9 mEq. was retained.

The average daily intake of electronegative minerals (phosphorus, sulfur and chlorine) in childhood was 221 ± 37 mEq., of which the kidneys excreted 169 ± 26 mEq. and the intestine 30 ± 8 mEq., while 22 ± 20 mEq. was retained. Approximately 85 per cent and 15 per cent of the excretion of the negative minerals take place in the urine and feces, respectively, in comparison to 73 per cent and 27 per cent, respectively, for the excretion of positive minerals. On the basis of body weight an average of 9.8 ± 1.4 mEq. of total negative minerals was consumed and only 1.0 ± 0.8 mEq. was retained per kilogram daily.

EXCESS MINERALS

When the quantity of positive minerals exceeds the quantity of negative minerals or the negative exceeds the positive, the excess for the food intake is designated by the terms alkaline-ash and acid-ash value, respec-

36. Shohl.[1] Sherman.[2]

tively; for the urine and feces the values are given as the excess of positive or negative minerals. The alkaline-ash values of the diets and the excess positive minerals retained by infants, children and man, in pregnancy and in lactation are shown in table 4 daily and daily per kilogram of body weight. All diets had an alkaline-ash value, though that of adult man was lowest (10 mEq.). The value for the diets of infants and children ranged between 21 and 24 mEq., and in pregnancy and lactation the amounts were 99 and 98 mEq. daily. A retention of cations in excess of anions occurred at all ages; on a unit weight basis there was an average daily retention per kilogram of 0.3 mEq. for childhood, 0.1 mEq. for man, 0.4 mEq. for pregnancy and 0.5 mEq. for lactation.

Retentions of both positive and negative minerals are essential to growth. Normally the body requires a very slight excess of total positive over total negative minerals, but greater excess positive mineral retentions indicate an emphasis on skeletal growth or an augmentation of mineral storage in bony tissue. Retention from the dietary of an excess of negative minerals indicates that formation of muscular, glandular and neural tissues is proceeding at the faster rate.

The amount stored of any one or all of these inorganic elements is influenced by the composition of the food and the current nutritive needs of the individual. The amount of each element ingested, the proportion of one element to another, the fat and other components of the diet—all are determining factors in metabolism and utilization of the positive and negative minerals. Indeed, the proportions of individual members of the positive and negative mineral groups in the diet may have more importance in general metabolism during growth than the total or excess quantities of the two groups of elements.[37]

Some foods or conditions may cause a change in the path of excretion from urine to the feces; that is, an increased output of calcium in the feces may be compensated by a decrease in output of calcium in the urine. The mineral elements which seem to be most susceptible to exchange between the urine and feces are calcium, phosphorus, sodium, potassium and chlorine. Cutaneous losses of potassium, sodium, chlorine and sulfur may cause a significant cumulative error in the retention values. With proper recognition of these possible inherent errors, metabolic balance data including the quantitative chemical determination of the positive (calcium, magnesium, sodium, potassium) and negative minerals (phosphorus, sulfur, chlorine) in the food over a given period of time, and the quantitative outgo of these constituents in the feces and urine, give valuable information concerning the physiologic activity in the body. The calculation of the difference between intake and outgo in the urine and feces, although in some cases it may be of an approximate nature, gives significant information on the metabolism of the individual elements and groups of minerals during the various stages of growth and physiologic function and render valuable service in the diagnosis and treatment of certain types of diseases.

37. Macy, Icie G.; Hummel, Frances, C.; Hunscher, Helen A.; Shepherd, Marion L., and Souders, Helen J.: Effects of Simple Dietary Alterations on Retention of Positive and Negative Minerals by Children, J. Nutrition **19**: 461-476 (May) 1940.

Council on Industrial Health

MEETING OF THE COUNCIL ON INDUSTRIAL HEALTH

The tenth meeting of the Council on Industrial Health was held at the Hotel Traymore in Atlantic City, N. J., June 7, 1942. Those present included Stanley J. Seeger, Chairman; Harvey Bartle, Leverett D. Bristol, Warren F. Draper, Philip Drinker, Leroy U. Gardner, Raymond Hussey, Anthony J. Lanza, Robert T. Legge, Clarence D. Selby, William D. Stroud and Carl M. Peterson, Secretary.

PROFESSIONAL RELATIONS

Steps taken to develop and maintain interest in industrial health in state, county and special medical societies were reviewed by the Committee on Professional Relations. Additional discussion demonstrated that contact with state committee personnel, officers of state medical societies and other influential people was more important now than ever before and that effort should be made to augment this activity if possible. It was recommended that additional assistance should be secured if agreeable to the Board of Trustees.

The association of the chairman of the Council as consultant to the Division of Industrial Hygiene, U. S. Public Health Service, was described in expectation that this type of organization would stimulate medical society cooperation and activity as well as improve associations between physicians and the personnel and programs of industrial hygiene bureaus in state health departments.

The growing interest in industrial health by the sections of the Scientific Assembly was viewed with great favor. Several of these cooperating committees have regarded some of their problems as common to all specialties, and it seems likely that a method of group consideration and subsequent recommendation to the Council could be adopted.

EDUCATION AND PUBLICATIONS

The Committee on Education and Publications emphasized particularly the urgency of postgraduate instruction. It was realized that, in making plans for such training, full account would need to be taken of the shrinking medical population and the enormous additional burden thrust on physicians in community practice.

Plans for better training of health officers in the essentials of industrial hygiene were described as an additional approach to adequate handling of certain medical requirements in industry and as a means of acquainting the general profession in better fashion about acceptable industrial health methods.

The Council noted that Dr. C. D. Selby had been added to the joint committee to investigate certification of industrial practitioners as a representative of the American Association of Industrial Physicians and Surgeons. The considerable difficulties attached to such a program were discussed.

The Committee on Occupational Dermatoses of the Section on Dermatology and Syphilology will be asked to review the necessity for a concentrated drive on dermatitis in industry as a direct contribution to reducing lost time in industry and to prepare useful educational material for the publications program of the Council.

PHYSICAL EXAMINATIONS

The Committee on Physical Examinations presented a tentative outline intended to conform as closely as possible to the American Medical Association manual on Periodic Health Examinations. After extensive and critical review it was agreed that the committee present a revised draft to the Council at the earliest convenient time.

OCCUPATIONAL DISEASE REPORTING

The same difficulties previously reported about securing accurate information relative to occupational disease incidence con-

tinue to operate. A number of recommendations for continued activity and greater improvement of reporting included:

(*a*) Better collaboration between health departments and industrial commissions.

(*b*) Improved financial support for the preparation of statistical studies by workmen's compensation authorities.

(*c*) Better cooperation from physicians in reporting occupational diseases.

Attention was called to an improved form for tabulating compensable conditions developed by the U. S. Department of Labor. It was also suggested that the Council and other interested agencies begin to urge on the Bureau of the Census that a tabulation of deaths by occupation be made available as soon as possible.

WORKMEN'S COMPENSATION

The Committee on Workmen's Compensation reported that conferences had been held recently with insurance executives to discuss medicoinsurance relations, such as supervision of medical service, organization of medical departments in insurance companies, medical field work and the procurement of physicians to undertake insurance and compensation practice in various localities. These conferences made it clear that further contact is necessary if an effective medicoinsurance program is to be developed. Representatives of stock and mutual casualty insurance companies meet regularly for the discussion of rates and claims. In this joint conference there is a subcommittee on medicine. It is hoped that working relations can be established with this committee after additional informal discussions have occurred with top executives.

The committee has also held conferences with representatives of the Bureau of Labor Standards in the U. S. Department of Labor and with executive officers of organized labor groups in Maryland. As far as can be readily determined, labor has made few attempts to formulate a definite health and medical program.

In spite of many surveys made on the operation of workmen's compensation laws, few pertinent medical data are available. It is not only desirable but highly important that such data be obtained. It is particularly true in those states where medical boards have been appointed in connection with the administration of occupational disease laws. The committee emphasized the need for acquainting state medical societies with the medical aspects of compensation legislation, since it is highly probable that these laws will be revised or expanded in many directions shortly. In the same way, a genuine effort should also be made to have properly qualified physicians hear testimony on controverted medical issues. Medical boards attached to compensation commissions appear to be an effective solution, and thought should be given to methods of organization and personnel of such boards. Medical societies also should be encouraged to study medical testimony in courts of law and quasijudicial administrative bodies with a view toward establishing methods of investigating questionable medical evidence. They should also be stimulated to maintain contact with industrial commissions through appropriate committees. The committee called attention again to the controversy in occupational disease legislation between schedule versus general coverage types of laws. It is desirable that the Council develop and express an opinion on this subject from a purely medical point of view.

In recognition of the fundamental importance of the report, the Council agreed that the committee be enlarged through the appointment of additional members and by the creation of advisory personnel representative of law, insurance, labor and other affected interests. The relation of this committee to other agencies in the American Medical Association, particularly the Bureau of Legal Medicine and Legislation and the Bureau of Medical Economics, should be clarified as well as with such other medical organizations as the National Tuberculosis Association, the American Heart Association and others as found desirable. The Council instructed the committee also to call the attention of the state medical societies to the need for a review of methods to control medical testimony and to engage at once in the preparation of articles on prevailing medical opinion about industrial disability.

RESEARCH

The Committee on Research was instructed to investigate those aspects of industrial medical experience most urgently in need of review and to develop recommendations calculated to encourage specific studies. Programs of the committees on industrial health in the sections of the Scientific Assembly in particular were thought to hold great promise if pursued in this direction. Particular attention also should be given to problems of industrial health administration and the rehabilitation and utilization in industry of handicapped persons.

INDUSTRIAL HEALTH AND THE WAR

The Council heard reports presented by the Subcommittee on Industrial Health and Medicine, the Division of Industrial Hygiene in the National Institute of Health, the Industrial Hygiene Division of the Medical Corps of the U. S. Army, and the Procurement and Assignment Service. These reports confirmed the impression that the medical profession is increasingly aware of the importance of industrial health but that there are great and unsolved problems still to be met before physicians find themselves in good position to respond to greatly increased demands for industrial medical service.

INDUSTRIAL NURSING

The representative of the Council on the Committee to Study the Duties of Nurses in Industry of the American Public Health Association reported that this survey was still in progress. The Council also reviewed a request for the publication of a pamphlet for the guidance of industrial nurses along lines previously followed by the State Medical Society of Wisconsin.

NUTRITION IN INDUSTRY

A joint committee representing the Council on Foods and Nutrition and the Council on Industrial Health was organized to consider scientific problems arising in the field of nutrition in industry, to study available evidence and to bring to the attention of the profession at large prevailing opinion on adequate nutrition of industrial employees. Members appointed on this committee were:

Representing the Council on Foods and Nutrition, James S. McLester, George R. Cowgill and Russell M. Wilder.

Representing the Council on Industrial Health, Leverett D. Bristol, Clarence D. Selby and William D. Stroud.

INDUSTRIAL MEDICAL SERVICE PLANS

Attention was paid to types of medical organization available to industrial workers and their families in ordinary as well as boom areas, and with special reference to those medical service plans now being developed by state and county medical societies and by labor unions. Subsequent studies will determine to what extent these and other experiments are meeting the existing demands for redistributing available medical personnel and facilities.

INDUSTRIAL MEDICAL ORGANIZATIONS AND CIVILIAN DEFENSE

The Council recommended that the Office of Civilian Defense be asked to issue a manual of instructions for physicians in industry and that specific plans of individual industrial organizations for medical management of catastrophes be given publicity if of sufficient merit.

WOMEN IN INDUSTRY

The formation of a subcommittee on the Health of Women in Industry was discussed. It was also agreed that women physicians could play a very useful role in industrial medical organization.

AVIATION MEDICINE

The Council created a committee to consider the advisability of a program in aviation medicine for application to ordinary industrial, test flight and transportation problems as opposed to purely military aspects, and having in mind the establishment of proper relationships with the activities now occurring in the National Research Council along the same lines.

Council on Pharmacy and Chemistry

REPORTS OF THE COUNCIL

THE USE OF BULK ETHER HAS PERIODICALLY RAISED CONSIDERABLE CONTROVERSY AMONG THE MEDICAL PROFESSION AND ALLIED SCIENCES. IN VIEW OF THE PRESENT EMERGENCY AND EXISTING SHORTAGES IT SEEMED TIMELY TO REVIEW THE STATUS OF THIS AGENT. AT THE REQUEST OF THE COMMITTEE ON DRUGS AND MEDICAL SUPPLIES OF THE DIVISION OF MEDICAL SCIENCES OF THE NATIONAL RESEARCH COUNCIL, THE COUNCIL ON PHARMACY AND CHEMISTRY ARRANGED FOR THE PREPARATION OF THE FOLLOWING REPORT BY DR. HARRY GOLD. WHILE THE AUTHOR MENTIONS BULK AMOUNTS OF ETHER UP TO THIRTY POUNDS, IT SHOULD BE POINTED OUT THAT U. S. P. XII STATES "ETHER TO BE USED FOR ANESTHESIA MUST BE PRESERVED IN TIGHT CONTAINERS OF NOT MORE THAN 3 KG. CAPACITY." THEREFORE IT WOULD BE ILLEGAL TO SHIP ANESTHESIA ETHER LABELED "FOR ANESTHESIA" IN CONTAINERS WHICH CONTAIN MORE THAN THIS AMOUNT.

AUSTIN E. SMITH, M.D., Acting Secretary,
COUNCIL ON PHARMACY AND CHEMISTRY.

THE USE OF BULK ETHER IN ANESTHESIA

HARRY GOLD, M.D.
NEW YORK

The belief that ether for anesthesia should be stored in small containers and that it should not be used for anesthesia twenty-four hours after the containers are opened dates back to the work of Baskerville,[1] who was the first to study extensively the conditions under which ether deteriorates. The foregoing was, in fact, his recommendation embodied in the United States Pharmacopeia during a period of about thirty years (U. S. Pharmacopeia IX, X, XI). The advice has been widely accepted and hospitals have pursued the practice of purchasing anesthetic ether in large numbers of one-quarter and one-half pound sealed metal cans. What remained after the first twenty-four hours was used for cleansing or other purposes.

In 1934 a study was published by Harry and David Gold[2] which challenged the validity of the twenty-four hour clause. It was shown that, in ordinary anesthetic ether cans which were opened many times and stoppered with cork, the contents remained pure by very delicate chemical tests for the usual impurities, aldehydes and peroxides, during periods of months. It was clear from this that the common belief that ether deteriorates quickly when the can is opened is an error. In a subsequent study by Hediger, Chenoweth and Gold[3] it was further shown that ordinary laboratory cork did not promote oxidation of ether by the fact that, when the ether was stored with ground-up cork in the can, the ether retained its purity over periods of several weeks. The cork stopper, therefore, presents no source of trouble. The possibility that ether might deteriorate if the stopper was accidentally applied too lightly, so that air had free access to the ether, was tested by placing the stopper on the ether can so lightly that the ether evaporated in a period of several days. Under these conditions it remained free of aldehydes and peroxides to the last.

In spite of the fact that these studies showed that ether taken from large containers (up to 30 pound drums) which had been opened and stoppered with cork during periods of months developed no chemical changes, anesthetists were reluctant to use such ether routinely for anesthesia. Such practice ran counter to tradition. If chemical tests couldn't distinguish bulk ether from ether in small cans freshly opened, could the anesthetist tell them apart by the reaction of patients? This was tested during a two year period at the New York Hospital in a series of 2,500 surgical cases. The reader may consult the original papers by the Golds,[4] by Hediger and Gold[5] and by Hediger, Chenoweth and Gold[3] for the details of these studies. Suffice it to say that when anesthetists were in the dark as to the source of the ether they couldn't distinguish, by the effect on their patients, ether in freshly opened small cans from ether in large drums which had been opened and stoppered with cork during periods of several weeks. A similar study carried out by Dooley and others[6] in Syracuse yielded similar results.

The suggestion issued[3] that hospitals abandon the purchase of ether in small one-quarter or one-half pound containers, and instead purchase anesthetic ether in bulk, in containers of 5 to 30 pounds. It was emphasized that the ether placed in the large container should be of the same high quality as the anesthetic ether now supplied in small sealed cans. There followed a storm of protest, mainly from industrial sources. The cost of ether in bulk is only about one-fifth that in small containers.

The routine use of ether in bulk for anesthesia has been adopted in many hospitals of various sizes throughout the United States.[7] We have information about this from one or more hospitals in New York, Baltimore, Boston, Syracuse, Rochester, Cleveland, Battle Creek, Ann Arbor and Chicago. The list is not complete. Some of these hospitals have now been using ether in bulk for anesthesia without encountering any difficulties during a period as long as five years. A survey made by Snoke[8] in 1941 disclosed that "all of the hospitals that are using bulk ether in 5 or 30 pound drums are satisfied that the quality of the ether is satisfactory." Some test the ether for aldehydes and peroxides by the U. S. Pharmacopeia tests before issuing the daily supply of small cans. Others have abandoned the testing, since long experience has shown it to be unnecessary.

The Twelfth Revision of the U. S. Pharmacopeia has sanctioned the practice by the revision of the article on ether. According to the new text, official ether for anesthesia may be stored in containers as large as 3 liters. Furthermore, the Pharmacopeia no longer considers ether unsatisfactory for anesthesia twenty-four hours after the container in which it is supplied is opened; it places no limit on the period of time in which ether remains fit for anesthesia after the container is opened. As will be discussed presently, the container into which the ether is transferred is a matter of great importance. The Pharmacopeia guards against

From the Department of Pharmacology, Cornell University Medical College.

1. Baskerville, Charles: Ethyl Ether for Anesthetic Purposes, Am. Druggist & Pharmaceut. Rec. **57:** 162, 1910.
2. Gold, Harry, and Gold, David: Stability of U. S. P. Ether After the Metal Container Is Opened, J. A. M. A. **102:** 817 (March 17) 1934.
3. Hediger, Ella M.; Chenoweth, M. B., and Gold Harry: The Use of Bulk Ether in Surgical Anesthesia: The Stability of Ether in Cork Stoppered Metal Containers, J. A. M. A. **114:** 1424 (April 13) 1940.
4. Gold, Harry, and Gold, David: The Stability of U. S. P. Ether After the Metal Container Has Been Opened: With Preliminary Results of a Clinical Comparison of U. S. P. Ether in Large Drums with Ether in Small Cans Labeled "For Anesthesia," Anesth. & Analg. **14:** 92, 1935.
5. Hediger, E. M., and Gold, H.: U. S. P. Ether from Large Drums and Ether from Small Cans Labeled "For Anesthesia": Comparison in Seven Hundred and Two Operations, J. A. M. A. **104:** 2244, 1935.
6. Dooley, Marion S.; Wells, C. J.; Frey, J. C.; Knoff, F. H.; Gable, W. J.; Mordell, J. S.; Beuttner, J. J.; McElwain, C. E., and Bentley, C. E.: Clinical Comparison of Drum and Special Ethers, J. A. M. A. **105:** 1033 (Sept. 28) 1935.
7. Gold, Harry: Some Recent Developments in Drug Therapy: The Dr. Max Ballin Memorial Lecture, 8th series, North End Clin. Quart. **2:** 5, 1941. Gold, Harry: A Common Sense Materia Medica in the Hospital, Hospitals **16:** 29, 1942.
8. Snoke, Albert W.: Ether Economy or Waste, Mod. Hosp. **57:** 69, 1941.

the danger from the transfer to containers that may not be suitable by directing that ether should not be used for anesthesia after it has been removed from the original container longer than twenty-four hours.

The need for the transfer of ether from large containers into smaller ones by the hospital pharmacist has focused attention on the fire and explosive hazard of the handling of ether. These hazards have been summarized in a bulletin of the National Board of Fire Underwriters.[9] It is well known that ether is inflammable in the form of its liquid and vapor. In suitable mixtures with air (1.85 to 36.5 per cent of the vapor in air by volume) it burns or explodes. The vapors are heavier than air. They tend to settle near the floor and establish islands of ether or flow in a stream through crevices under the door and down the stairs. Ignited at any point, the stream will propagate the flame for considerable distances. Contact of the vapors with flame, a static or friction spark or any object heated to the appropriate temperature may cause fire or explosion.

These hazards, however, have long been known and apparently are sufficiently well appreciated by the average hospital pharmacist so that fires and explosions from the transfer of ether as handled by the hospital pharmacist are extremely rare. Snoke,[8] assistant director of the Strong Memorial Hospital of Rochester, points out that "almost every hospital pharmacy stocks ether, alcohol, acetone and gasoline in bulk and repackages them in small containers to be distributed to the wards and laboratories for various uses. The transferring of 5 or 30 pounds of ether into small containers does not present much more fire hazard than now actually exists in any pharmacy." In this connection Clarke,[10] chief pharmacist of the New York Hospital, states that "principally as a result of adopting the use of bulk ether for anesthesia" the pharmacy personnel acquired more respect for the hazards of handling ether and a more efficient technic for avoiding those hazards than used to be the case when bulk ether was used only for cleansing and solvent purposes.

The containers in which ether is issued to the operating room may be the tins in which anesthetic ether is supplied in commerce. They must first be thoroughly rinsed with the fresh ether with which they are to be filled. A special copper can may be made. The specifications for such a can have been described by Clarke.[10] The container is a matter of great importance. Amber colored bottles are fairly satisfactory, but they present the danger of breakage. Clear glass bottles cannot be used, since the exposure of ether to sunlight leads to fairly rapid deterioration.

The transfer of ether from a 5 pound can or a 30 pound drum into the smaller containers is managed differently in different hospitals. The details of the technic employed at the New York Hospital have been described by Clarke.[10] The transfer may be effected by means of a clean glass funnel. In the case of 30 pound drums, a copper siphon arrangement as described by Clarke is very useful. The procedure should be carried out in a room free of flames or burners and free of mechanical moving parts which may be a source of sparks. Free ventilation is necessary. The larger the room, the less the danger of developing an explosive mixture of ether vapor with air during the process of the transfer. This danger, generally speaking, is extremely small. The National Board of Fire Underwriters[9] states that the vapor from a quarter pound of ether will make 60 cubic feet of air explosive. This is approximately the minimal explosive concentration of ether vapor in air. We produced such an atmosphere in a laboratory room and found it almost unbearable for more than a few moments to several individuals who entered. One third of the minimal explosive concentration of ether vapor imparts a very strong odor of ether to the atmosphere. Dangerous quantities of ether vaporized during the transfer are not likely to escape the notice of the pharmacist. An atmosphere in which the odor of ether is faint is not explosive. The transfer of a 5 pound can of ether into small containers in a room of about 2,000 cubic feet would not produce an explosive atmosphere even if the entire quantity escaped in the form of vapor evenly distributed throughout the room.

The safety of bulk ether for surgical anesthesia appears to be established. The danger of the transfer from large to small containers by the hospital pharmacist, if the foregoing precautions are observed, is negligible. Snoke[8] suggests that ether in 5 pound tins or 30 pound drums is practical only in institutions that use a considerable amount of ether, namely those that have a weekly ether consumption of more than 5 or 10 pounds. The financial saving is considerable. Clarke[10] states that "a hospital may reduce its ether for anesthesia bill by between 68 to 78 per cent—a striking thought when it is realized that a million dollars' worth of ether was sold last year in small containers specially labeled for anesthesia." The wider application of this practice may be of particular importance in the present state of the nation, with the urgent need for economy in labor and in metal.

9. Handling Ether in Hospitals, National Board of Fire Underwriters, Bull. 115, Jan. 2, 1941.
10. Clarke, Donald A.: Technic for Preparing Bulk Anesthetic Ether, American Professional Pharmacist **8**, February 1942.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Acting Secretary.

THIAMINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1941, p. 551).

The following dosage forms have been accepted:

GEORGE A. BREON & CO., INC., KANSAS CITY, MO.

Tablets Thiamine Hydrochloride: 1 mg. and 5 mg.

DEXTROSE (See New and Nonofficial Remedies, 1941, p. 179).

The following dosage forms have been accepted:

GEORGE A. BREON & CO., INC., KANSAS CITY, MO.

Ampul Solution Dextrose 50% (W/V): 20 cc.

FLINT, EATON & COMPANY, DECATUR, ILL.

Ampul Solution Dextrose 50% (W/V): 50 cc. and 100 cc.

NICOTINIC ACID (See New and Nonofficial Remedies, 1941, p. 555).

The following dosage form has been accepted:

FLINT, EATON & COMPANY, DECATUR, ILL.

Tablets Niacin: 25 mg.

NICOTINIC ACID AMIDE (See New and Nonofficial Remedies, 1941, p. 556).

The following dosage forms have been accepted:

DRUG PRODUCTS CO., INC., LONG ISLAND CITY, N. Y.

Ampul Hyposol Solution of Nicotinamide, 50 mg. per cc.: 1 cc.

Hyposol Solution of Nicotinamide, 50 mg. per cc.: 10 cc. vial. Preserved with 0.5 per cent of chlorobutanol.

FLINT, EATON & COMPANY, DECATUR, ILL.

Tablets Niacinamide: 50 mg.

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SATURDAY, SEPTEMBER 5, 1942

CONGRATULATIONS TO THE BUREAU OF MEDICINE AND SURGERY OF THE NAVY

On Monday, August 31, the United States Navy celebrated the one hundredth anniversary of the establishment of its Bureau of Medicine and Surgery by dedicating the new Navy Medical Center at Bethesda, Maryland. The proceedings included an international broadcast by five networks, symbolic of the worldwide scope of the work of this department of the Navy. The ceremony was featured by an address of President Franklin Delano Roosevelt and included messages to naval installations in Iceland, Ireland, Honolulu and Panama, with responses from Capt. Brython P. Davis, commanding officer of Destroyer Base Hospital No. 1, North Ireland; Capt. J. J. McMullin, commanding officer of the Pearl Harbor Naval Hospital; Capt. Lewis W. Johnson, senior naval medical officer in Iceland, and Capt. Howard F. Lawrence of Panama. No celebration is contemplated at these remote points where the Navy is actively in service.

The motto of the United States Naval Medical Department is:

To keep as many men at as many guns as many days as possible.

The career of the United States Naval Medical Department over the century has been marked by many brilliant episodes, including several instances in which Naval medical officers took over command following the deaths of officers of the line. For example, a naval medical officer, Dr. Richard C. Edgar, was the recipient of those famous lines of Captain Lawrence, destined to become the motto of the Navy, "Don't give up the ship."

The first chief of the new Bureau of Medicine and Surgery in 1842 was William Paul Crillon Barton of Philadelphia. Rear Admiral Ross T. McIntire is twenty-third in a long line of surgeon generals of the Bureau of Medicine and Surgery of the Navy.

In the early days of the Navy a ship's surgeon received twenty-five dollars a month and had the status of a hired hand. Today naval medical officers achieve high rank and are engaged in a multitude of scientific activities representative of the finest advancement of medicine. The functions of the medical officers of the Navy include research on problems related to ships, airplanes and land warfare. Already notable contributions have been made on submarine warfare, aviation, treatment of burns, the effects of blast and the control of many types of epidemic disease. Naval medical officers have designed hospital ships, invented new appliances and contributed magnificently to research in internal medicine and in surgery.

A century ago the headquarters of the Bureau of Medicine and Surgery included a chief, an assistant chief and two clerks. Today the expanded Navy includes many hundred thousands of men and thousands of medical officers and medical personnel. Its responsibilities for medical care include the Marine Corps and Coast Guard as well as itself.

The first century has been one of great achievement and high scientific endeavor. To the Surgeon General of the Navy, Rear Admiral Ross T. McIntire, and to the men whom he leads, our congratulations.

JAUNDICE IN THE ARMED FORCES

Elsewhere in this issue (page 51) appears an official statement from the United States Army Medical Department, in the form of a circular letter issued to all medical officers, reporting on the cases of jaundice which occurred among our troops, apparently related to vaccination against yellow fever. This statement, issued promptly by the Army Medical Department, will make clear to those capable of reading it understandingly the problems that are concerned and the manner in which the Army Medical Department is studying them.

Last week the Chicago *Tribune,* apparently having revised its old motto to read

"The *Tribune,* right or wrong, but right or wrong, the *Tribune,*"

persists in its attack on the Army Medical Department in association with this incident. THE JOURNAL has indicated previously its belief that the attack is unwarranted, that it will tend to undermine military and civilian morale and break down confidence in scientific medicine. Fortunately, the *Tribune* seems to be quite alone in the attack and in the persistence.

In the course of its editorial the *Tribune* makes a number of misstatements of fact which are here corrected. The *Tribune* states:

"It appears in dispatches from Washington that the Navy, using a vaccine prepared according to a different formula, had had no such record of deaths and illness as the Army has disclosed."

This is untrue! The Navy used the same vaccine that was used by the Army, inoculating over 100,000 men and having a considerable number of cases of jaundice although, of course, not as many as occurred in the Army. The United States Public Health Service used the same vaccine in thousands of cases and also had cases of jaundice. Thus far there have been no reports of deaths from this cause in the Navy. It must be remembered, however, that naval units are much smaller, that they are operating at tremendous distances and that reports of illness come in more slowly, although deaths are reported immediately.

The *Tribune* states:

"The probability is that the error of judgment was not committed by Maj. Gen. James C. Magee, the Surgeon General of the Army, for he is said to have been opposed to the wholesale vaccinations against yellow fever. Evidently whoever was to blame is to be protected."

This statement is untrue! Major Gen. James C. Magee did not oppose the vaccinations. Had he done so, they would not have been made. There is no evidence that anybody is to be blamed for anything that should not have been done because there is no evidence that anything was done that was not warranted by the situation.

The *Tribune* persists in its reiteration that it was a mistake to vaccinate our troops against yellow fever—this in the face of the fact that inoculation against yellow fever is now a well established procedure, yielding immunity and protection against that vicious and fatal disease.

The report of the Army Medical Department also makes clear the difficulties of diagnosis of jaundice and of relating it definitely to the vaccination. The adviser or advisers of the editorial writer for the Chicago *Tribune* seems to be wholly unaware of the details associated with the entire procedure.

In its editorial statement the *Tribune* charges that THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION has misled its readers relative to this situation. That charge is untrue. The *Tribune* says:

"When the facts were out and the *Tribune* had called for an impartial inquiry . . . he [the editor of THE JOURNAL] insisted that the Army was conducting a thorough investigation and that the report would be forthcoming promptly. He [the editor of THE JOURNAL] was wrong again."

The evidence of the untruth of this statement by the Chicago *Tribune* is apparent in the official report which is published in this issue of THE JOURNAL and which was sent to all medical officers of the United States Army. The statements of the *Tribune* relative to THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION—which, incidentally, it carelessly calls the American Medical Journal—are just as unfounded as most of what the *Tribune* has printed relative to the entire situation.

FEDERAL AID FOR MATERNITY CARE FOR WIVES OF SERVICE MEN

Legislation has been introduced in the Congress, at the request of President Roosevelt, under which it is planned to provide maternity services for the wives of service men. The bill was introduced in the Senate as S. 2738 by Senator Barkley for Senator George and in the House as H. R. 7503 by Representative Doughton. It proposes to amend title V of the Social Security Act, relating to grants to states for maternal and child welfare, by adding the following provision:

Part 6—Wartime Services

Sec. 551. For the purpose of extending and improving services authorized in parts 1 [maternal and child health services], 2 [services for crippled children] and 3 [child welfare services] of this title by reason of conditions arising out of the present war, there are hereby authorized to be appropriated pursuant to sections 501, 511 and 521, and allotted pursuant to sections 502 (*b*), 512 (*b*) and 521, in addition to the sums specified in such sections, such sums as may be deemed necessary for each fiscal year during the period of the present war and six months following its termination. The chief of the Children's Bureau is hereby authorized to detail under emergency conditions arising out of the present war such personnel as may be necessary to cooperate with state agencies in carrying out the purposes of this title.

In transmitting this legislation to the Congress, President Roosevelt, after referring to the fact that the impact of war on family life has created urgent needs which previously authorized federal appropriations combined with state and local funds have not been able to meet, said, in part:

The legal basis for services for children contained in title V, parts 1, 2 and 3 of the Social Security Act, and the administrative foundations for such services developed in every state under the provisions of the act, are now available, but the funds authorized in this title are not sufficient to meet wartime needs. I recommend, therefore, an amendment which will authorize the appropriation of such additional sums as may be necessary to enable the Children's Bureau of the United States Department of Labor to cooperate with state agencies now administering maternal and child health services, services for crippled children and child welfare services in extending these programs to meet war conditions. It is estimated that the sum required for these purposes for the first year will not exceed $7,500,000.

A draft of the proposed legislation is transmitted herewith. The provisions of the bill expire six months after the end of the present war, as is common with other wartime measures recently enacted by Congress. The draft bill maintains the normal procedure of allotting funds to the states provided by title V of the Social Security Act. However, all the additional sums authorized for maternal and child health services and services for crippled children are to be allotted in accordance with the provisions of sections 502 (*b*) and 512 (*b*), namely on the basis of the financial need of each state for assistance in carrying out its state plan for such services. To meet extraordinary wartime emergencies the bill also authorizes the chief of the Children's Bureau to detail such personnel as may be necessary to cooperate with state agencies in carrying out the provisions of title V.

Neither the President's letter transmitting the legislation nor the language of the bill itself discloses the detailed purposes for which this federal money will be spent. A release of the Office of War Information

(OWI-376), however, does contain information that reflects some of the major problems to be dealt with by the use of the funds to be made available. Katherine F. Lenroot, chief of the Children's Bureau of the United States Department of Labor, this release states, hails as a great wartime humanitarian move the President's request that Congress amend the Social Security Act to make more money available for child health and welfare services during the war period. She suggests that, of the total federal money to be made available, something over $4,000,000 will be used for maternal and child health in war production areas, about $750,000 for maternity care for wives of service men and about $2,000,000 for the extension of child welfare services in overcrowded areas. The release leaves open the question as to whether maternity care will be supplied to the wives of defense workers to the same extent as it is proposed such care will be furnished to the wives of service men.

Miss Lenroot is quoted as saying:

> I have long been deeply concerned over the serious effects of war on the well-being of children in the United States. As early as the summer of 1940, reports began coming to the Children's Bureau of rapid increase in population in industrial areas to which war contracts were going and in military areas where cantonments were being constructed. Overcrowded houses, trailer camps, lack of schools, lack of recreation facilities, too few public health nurses and doctors, and inadequate hospital facilities began to upset the opportunity for children to grow up into healthy normal adults.
>
> After Pearl Harbor these conditions were rapidly intensified and spread over large areas. Great numbers of children were also affected when their fathers left home for military or industrial service, and when the communities in which they lived began to feel the pinch of a shortage of such professional people as doctors, nurses and teachers.
>
> Since December 1940 the advisory committees to the Children's Bureau have been recommending the provision of maternal and child health services and of child welfare services in defense communities and the increase of federal grants to the states for these purposes. The State and Territorial Health Officers in April 1941 and again in 1942, and the National Council of State Public Assistance and Welfare Administrators in December 1930 and again in 1941 made similar recommendations. Again and again these state administrators have written to the bureau describing the need for expanding maternal and child welfare services especially in the areas where increased population due to the war effort created great need for these programs. Special problems arose such as the need for hospital beds and medical care for maternity patients and sick children, the need for day care for children of working mothers, and mounting juvenile delinquency.
>
> So far as possible with the federal aid provided, the state agencies made available health services for mothers and children and child welfare services in the areas where the need was most acute, but this could be done only to a limited extent.

The study given during the past two years as to the effect on children of defense preparations and war conditions has brought to light certain outstanding problems on ways and means for dealing with the problem, Miss Lenroot said. She listed these as (1) need for health services and medical care for mothers and children, especially in defense areas, (2) need for maternal care for wives of men in the armed forces and (3) need for child welfare services, especially in the defense areas, to assist in dealing with problems of child neglect and juvenile delinquency. In addition to these major problems she declared there were many others affecting the well-being of children and said that federal grants to the states under the Social Security Act would give the states the urgent assistance they need in coping with these wartime conditions. This federal money, it is understood, will be allotted to the states on the basis of need and the money will not have to be matched in amount by state funds. In the Senate the bill has been referred to the Committee on Finance and in the House to the Committee on Ways and Means.

It is assumed that public hearings will be held to develop fully the facts concerning the necessity for this additional appropriation and the specific manner in which the program to be carried out under the bill will be administered.

"FOUND: A ONE DAY CURE FOR SYPHILIS"

In the *Reader's Digest* for September appears an article by Paul de Kruif entitled "Found: A One Day Cure for Syphilis," heralded by the editors of that periodical as "the medical sensation of the year." In this article Mr. de Kruif states that "now there actually is promise of a one day cure." He asserts without, of course, any basis in fact that "the standard eighteen month course of treatment is too painful, too dangerous, too prolonged for the mass cure of early syphilis." After describing certain experiments conducted by Drs. Walter M. Simpson, H. Worley Kendell and Donald L. Rose in the Miami Valley Hospital, he concludes:

> With a one day cure available, with plenty of doctors and nurses trained in fever therapy, and using equipment which costs little war material, we ought really to begin to wipe out the horror of syphilis. There are a million active cases in the United States. With this powerful new treatment, all persons found infected with active syphilis could be taken out of circulation and their danger to the community quickly abolished. The immediate expansion of this chemothermic treatment should bring hope to those countless hundreds of thousands who are inadequately treated or who are not treated at all. In the meantime, all those now under standard treatment should continue it until the new chemothermic treatment becomes generally available; this for their own as well as for the public safety.

As nearly as can be determined, all this effusion is based on a few paragraphs from an article on fever therapy by Drs. Walter M. Simpson, H. Worley Kendell and Donald Rose, published in the *British Journal of Venereal Diseases* for January-April 1941, in which the authors state:

> The present plan of treatment is as follows: A ten hour session of fever at 106 F. (41.1 C.) has been adopted tentatively as the initial unit of fever, since these limits have proved to be safe and practical in the management of patients with refractory gonococcic infection. Prior to the fever session a single injection of 4 grains of insoluble bismuth is administered intramuscularly. During the first seven hours of the height of fever, 240 mg. of mapharsen are administered intravenously by the slow intravenous drip method. No additional antisyphilitic therapy is given.

To this they append the following highly conservative opinion:

> While no conclusions are permissible since the period of post-therapy observation is as yet less than two years, the prompt resolution of clinical symptoms and the favorable serologic responses would indicate that further diligent inquiry is demanded. The results of this purely experimental undertaking will be made the subject of a later report.

In their ultimate "conclusions" they say:

> At the present time such treatment should be considered strictly experimental.
>
> The results achieved thus far should stimulate other investigators to engage in long term, controlled experiments with a view to the introduction of a more rapid, more certain, less dangerous and less costly method of treatment.

In a review of syphilis to appear soon in the *Archives of Internal Medicine*, Drs. Frank W. Reynolds, Charles F. Mohr and Joseph Earle Moore of Baltimore say:

> With his usual uncritical judgment, hyperenthusiasm and willingness prematurely to capitalize journalistically on sober scientific experimentation, de Kruif has unhappily drawn nationwide attention to this "one day cure" for syphilis. This tendency of medical journalists to raise false hopes in lay minds can only be deplored. With all due respect to democratic freedom of speech, it is too bad that no censorship exists to compel conservative accuracy from medical sensationalists.

This is another instance in which Mr. de Kruif has expanded preliminary medical investigations into announcements to the public that go far beyond anything that the available evidence could warrant. THE JOURNAL is being deluged with letters from physicians indicating that the article already is doing great harm in creating dissatisfaction among persons with syphilis as to time that may be required to bring about cure. Dr. Walter M. Simpson is an officer in the Bureau of Medicine and Surgery of the United States Navy and has been for some months away from contact with the continental United States. It is unfortunate that in his absence the statements of Mr. Paul de Kruif should have placed him and his research in such an unenviable position before the medical profession.

THE USE OF BULK ETHER IN ANESTHESIA

Elsewhere in THE JOURNAL is a report [1] on the use of bulk ether in anesthesia, jointly sponsored by the Council on Pharmacy and Chemistry and the Committee on Drugs and Medical Supplies of the Division of Medical Sciences of the National Research Council. At the suggestion of the Committee on Drugs and Medical Supplies of the Division of Medical Sciences of the National Research Council, the Council on Pharmacy and Chemistry arranged for the preparation of this report.

Apparently bulk ether has not been employed more widely for anesthesia mainly because of an impression regarding the possible deterioration of ether after it has been exposed to air. As far back as 1934 reports challenged the validity of the claim that ether should be stored only in small containers; they have revealed also that ordinarily cans containing ether may be opened many times, if done carefully, without evidence when subjected to chemical tests for aldehydes and peroxides that the contents undergo deterioration. Other reports have discussed the technic of caring for bulk ether. One of these [2] presents in detail a satisfactory arrangement for a laboratory in which bulk ether may be handled. Included are descriptions of the lighting, ventilation, electrical switches and the specifications which have been set forth by the National Board of Fire Underwriters of New York on the question of handling ether in hospitals. Details, such as an appropriate sign on the door warning against smoking, and the value of records, are not forgotten. The author offers also a diagram of an apparatus used at his hospital to permit transferral of measured amounts of anesthetic ether from the bulk container to smaller cans.

The present report [1] substantiates others which claim that anesthetic ether can now be sold safely in large containers. The safety of storing is due largely to the chemical and pharmaceutic manufacturers, who by extensive research have been able to develop methods of manufacture which avoid the formation of peroxides. Originally peroxide formation was fairly rapid and dangerous. The experiments and experiences with the keeping quality of ether in bulk containers presented in the current report were made in large hospitals or moderately large hospitals in which the ether is used rapidly. Further, these hospitals have also the facilities to test the ether from time to time for the presence or absence of deterioration. In small hospitals, in which a bulk package of ether for anesthesia may amount to 30 pounds, it may not be utilized in six months or more; there is danger of its being peroxidized toward the end of that period. For such small hospitals the use of bulk ether would not be advisable.

The author of the report appearing in this issue of THE JOURNAL states that "according to the new text (the Twelfth Revision of the U. S. Pharmacopeia) official ether for anesthesia may be stored in containers as large as 3 liters." The Pharmacopeial statement reads "Ether to be used for anesthesia must be preserved in tight containers of not more than 3 Kg. capacity." Three liters of ether would equal approximately 71 per cent of 3 Kg. by weight, and 3 Kg. is equivalent to approximately 4,200 cc. In view of the restriction outlined in the Pharmacopeia it would be illegal to ship ether labeled "For anesthesia" in containers which contain more than 3 Kg. Actually, however, the editorial office of THE JOURNAL and the office of the Council on Pharmacy and Chemistry have been informed that ether which meets the standards of the U. S. P. requirements is being shipped in drums which contain up to 30 pounds (13.6 Kg.). Presumably such ether is not labeled "For anesthesia."

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1. Gold, Harry: The Use of Bulk Ether in Anesthesia, this issue, p. 44.

2. Clarke, Donald A.: Technic for Preparing Bulk Anesthetic Ether, American Professional Pharmacist, February 1942.

Superintendents and medical directors of hospitals can assume the responsibility of investigating the possible use of bulk ether in their institutions. The use of bulk ether, at least for the duration of the emergency, will be a contribution to conservation as a war effort. These are times when restrictions and savings bear special significance. Assuming that the evidence is now sufficient to permit the general use of bulk ether for anesthesia, provided the ether meets Pharmacopeial standards, there seems to be no reason why these official standards cannot be changed for the duration of the emergency so that the restricting statement "Ether to be used for anesthesia must be preserved in tight containers of not more than 3 Kg. capacity" will not prove a legal bar to the general acceptance of bulk ether when indicated.

Current Comment

KANSAS ACCIDENT REPORT

The Kansas State Board of Health has issued its tenth consecutive report of accidental deaths occurring in the state.[1] Kansas was a pioneer state in the study and effective reporting of accidents as a cause of death. The report contains the usual statistical studies covering the state accidental death rate, which showed the highest number of accidental deaths since 1938, although this cause dropped from fifth to sixth place as the result of increases in other rates. As in other localities, the highest death rate from accidents is due to causes other than the automobile. These accidental deaths due to other causes are twice as numerous as those due to the automobile. The leading cause of death was drowning. Deaths among males were twice as great as among females. The largest number of accidents occurred in the age group between 80 and 84. Among the interesting features of this report has been the compilation of freak accidents. A 1 year old baby caught a navy bean in its larynx and choked to death. A boy enacting a scene from a book was strangled to death by a rope. A man riding on top of a load of trash was knocked off and killed when the truck drove into an underpass. A boy climbing a windmill to make adjustments was knocked to the ground when the wheel shifted with a change of wind. A 3 year old baby fell into a waste pit of a basement drain and was drowned. A man unfastened a chain which held a load of logs on his truck and the loosened logs slid and killed him. A mother trying to keep her child from falling out of an automobile fell from the car herself and was killed. A man fell into the greasing pit of a filling station; a young man was killed by a live wire while riding on top of a house in the process of being moved; inhaling furniture polish precipitated pneumonia in a small child. These and similar instances indicate the increasing importance of campaigns for safety. The report also presents suggestions for insuring safety in the home, with the motor vehicle, in the industrial situation and in the so-called public situation.

1. Kansas State Accidental Death Report 1941, Kansas State Board of Health, Topeka.

ADMISSIONS TO MEDICAL SCHOOLS

In an article by President Harry D. Gideonse of Brooklyn College printed in the New York *Times,* August 9, the question is raised as to whether we are "gradually by deliberate organization and regulation trying to keep our own youth from making an effective transition to the economic responsibilities of adult life." President Gideonse refers to trade union rules, collective bargaining restrictions and other regulations designed to discourage newcomers in trades and professions. He cites the profession of medicine as an example of restrictive practices. Thus it is pointed out that the number of physicians and surgeons has declined from 160 per hundred thousand of our population in 1910 to 125 in 1930. The most reliable data available indicate that the number of physicians per hundred thousand of population in the United States did decrease from 146 in 1910 to 127 in 1930, but it had risen to 133 in 1940. With the increase in student enrolment and the adoption of an accelerated program of medical education, this proportion will rise still more rapidly within the next few years. The Commission on Medical Education, in its final report published in 1932, emphasized the low ratio of population per physician in the United States (780) as compared with European countries, which varied from 880 in Austria to 2,890 in Sweden. The commission in its report estimated that at that time there was an oversupply of at least 25,000 physicians in this country. The number of physicians actually needed and their most effective distribution are complicated problems involving most of the factors affecting our whole social organization. President Gideonse further states that "most New York educators know able youngsters who could not fail to meet objective standards and who find it hard, if not impossible, to enter training for their chosen profession." Inevitably in any system of higher education a considerable number, including many deserving and promising students, are denied the opportunities which they seek. Few, if any, of the medical schools of the country are entirely satisfied with the quality and promise of all the students they admit to their schools. In spite of the most painstaking efforts on the part of admissions committees, many mistakes are made in the selection of students. This is shown by the large percentage of failures in the medical schools. Furthermore, the cost of medical education far exceeds that of any other type of higher education, and most of the medical schools of the country are now inadequately financed to meet their present responsibilities. From the point of view of sound education, financial support, personnel and the necessary physical and clinical facilities, it would be simply impossible to offer the opportunity of a medical education to every young American able to meet the specific subject requirements for admission to a medical school. Moreover, admission of some 12,000 to 14,000 who now apply instead of the 6,000 to 7,000 actually admitted would result in the production of great numbers of physicians who could never gain a livelihood or even find opportunity to work in the profession for which they had been educated. The effects on the standard of medical practice, the morals and the morale of the profession are easily imagined.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war and such other information and announcements as will be useful to the medical profession.

THE OUTBREAK OF JAUNDICE IN THE ARMY

1. This Circular Letter, No. 95, is issued as a supplement to Circular Letter No. 45, S. G. O., dated May 13, 1942, Subject "Jaundice." For military reasons this report omits statements of numbers, rates and specific locations.

2. (*a*) The occurrence of various types of jaundice among troops in the Army during January and February 1942 averaged about 125 cases a month. Included among these were a few cases of the type of the disease which is the subject of this report. Taking as a starting point the sudden appearance in widely separated locations of cases which were the first of a series of similar cases, the outbreak of jaundice in the Army may be said to have begun in the week ending March 7, 1942. The peak of the incidence among troops in the continental United States was reached in the week ending June 20, since when there has been a progressive and uninterrupted decline. . . . Advance, but incomplete, information from numerous stations indicates that there has been a further considerable decline in the past two weeks.

(*b*) As jaundice of undetermined cause was not separately reportable on the statistical reports during March and early April it has been necessary to make extrapolations on the basis of samples to allocate portions of known totals to a few respective weeks. These figures, as well as weekly figures, are being reviewed and revised frequently. They are, however, nearly correct and it is not expected that final figures will make any significant change in the general graph of the outbreak.

(*c*) Statistics for stations overseas, coming in more slowly, are less complete than those for stations in this country. They indicate that the outbreak began in widely separated locations abroad at about the same time as the start of the outbreak in this country in the first two weeks in March. The peak of incidence appears to have been reached a week or two later than in this country. The decline is occurring progressively as in the continental United States. The occurrence of cases at overseas locations, however, is particularly related to the arrival of certain troop units at their foreign destinations, and has varied in a manner similar to that of the fluctuating incidence of the disease in certain posts in this country.

3. (*a*) The clinical course of the disease has been strikingly uniform in the great majority of patients. It has resembled most closely the so-called "catarrhal jaundice" or epidemic hepatitis of unknown etiology. The onset is gradual, often imperceptible, until the appearance of jaundice. Increased susceptibility to fatigue, lassitude and anorexia are the common prodromal or early symptoms, and in many cases are the only symptoms. Nausea and vomiting may occur and diarrhea may precede other symptoms. Fever is absent or the temperature may be slightly elevated. The leukocyte count is usually normal, occasionally showing a relative increase of monocytes. Pains in the joints and urticaria occur variably, usually in about 20 per cent of cases. Darkly colored urine, yellowing of the skin and sclerae, and lightly colored stools are the rule. The liver is found to be enlarged and tender in about 20 per cent of cases. Bile pigments appear in the urine and blood. The icteric indexes range from 15 to 200, occasionally to 300. Prothrombin levels are reduced and the results of excretion tests, such as the bromsulphalein test, indicate various degrees of disturbance of hepatic function. Most often, cases have been mild; many discoverable only at special inspections. In a smaller but considerable number the disease has been more severe, showing a variety of stages of hepatic insufficiency. The case fatality rate, based on reported admissions to hospitals, is approximately 0.2 per cent. It would be considerably lower than this if the large number of cases treated in quarters or affected with only the milder and non-incapacitating symptoms were known and available for statistical computation. The above brief outline has of necessity omitted description of many interesting and important clinical varieties of this disease, and has omitted also discussion of therapy. Groups of investigators have been working on all phases of these subjects under the direction of the Surgeon General. The reports of their findings will be published later.

(*b*) In general recovery has followed in four to eight weeks. As observations progressed a conservative tendency to prolong the convalescent period was widely manifested. In some stations convalescent camps were established to permit continuation of supervision of diet and activities in a regimen by which the patient was returned to duty gradually. Prognosis is favorable. Sufficient evidence is available to warrant the statement that recovery is complete in the vast majority of cases and that permanent liver damage may occur in only a few.

(*c*) A variety of diagnostic terms has been applied to this disease. These have included "jaundice without

known cause," "catarrhal jaundice," "infectious hepatitis," "epidemic hepatitis," "cholangitis," "obstructive jaundice," "yellow jaundice" and, for reasons to be explained later, "postvaccinal hepatitis." In addition, the questionnaire in use and the blanket diagnosis employed have served as a dragnet for all types of jaundice. Furthermore, at this stage the statistics include records of cases originally diagnosed as "jaundice" but later found to be different. The process of sorting these out and making necessary corrections is in progress. The result will clarify the picture but will not alter the main characteristics of the outbreak.

4. (*a*) Pathologic material from all available sources has been assembled at the Army Medical Museum, Washington, D. C., which has in effect established a central registry for specimens from cases of this disease. Comparative studies are being conducted on an extensive scale. It is requested that gross material from fatal cases of hepatitis, together with copies of the clinical abstracts, immunization records and autopsy protocols be sent promptly to the Army Medical Museum. Of special importance is material which may be used in studies to determine the nature and extent of any late effects of the disease. Officers performing postmortem examinations on persons who have died from accident or disease are requested to state, when possible, in the protocol whether the deceased has suffered from an attack of jaundice, within a period of one year or longer prior to the date of autopsy. This request is made in order to gather further information concerning the repair of liver injury.

(*b*) The chief pathologic lesions are those of acute or subacute yellow or red atrophy of the liver. The earliest lesions consist of frank necrosis of liver cells in the central parts of the lobules. There are no inclusion bodies present at any stage. The lesions differ distinctly from the lesions of yellow fever.

(1) In the fatal cases of hepatitis observed during the present year, death usually has occurred from two to six weeks after the onset of the disease. The earlier stages of hepatitis have rarely been observed. It is evident that the destructive process and the removal of débris by lysis is rapid. Within ten days the bulk of the necrotic material has usually been removed completely. The stroma is rarely damaged to any extent; in many areas the lobular framework remains intact. In most cases the destructive process is not diffuse; the severity of the damage tends to vary in different parts of the liver. In some areas the hepatic tissue is almost completely destroyed, whereas in other areas only the central parts of the lobules become necrotic. Unlike many forms of destructive liver disease, fatty changes are not a conspicuous feature in hepatitis of the type here discussed. Repair of the injured liver is brought about mainly by multiplication and hypertrophy of remaining liver cells. The resulting lobules tend to be very large but are often of atypical construction. The part played by "regenerated bile ducts" and the origin of these tubular structures is controversial. Destruction of liver tissue and the removal of débris is in this disease invariably accompanied by inflammatory reaction and, hence, the term "hepatitis" is proper.

(2) Changes in organs other than liver are common. Of particular interest is the marked edema, often accompanied by intense inflammation of the gastrointestinal tract. Although any part of the tract may be involved, including the esophagus, the changes are usually most pronounced in the cecum. The relation of these lesions to the hepatitis is not as yet known. The kidneys may present the picture commonly known as bile nephrosis (cholemic nephrosis). An acute or subacute splenic tumor is usually present. Hemorrhages, often extensive, in serous and mucous membranes are likewise common. The central nervous system often shows changes similar to those found in other severe toxic metabolic disturbances.

(3) To what extent is the liver damaged in the average nonfatal case of hepatitis? To what extent is this damage repaired? These questions are of great interest. It must be emphasized that the extensive damage observed in the rare fatal cases are not duplicated in the nonfatal cases. It is more than probable that "yellow or red atrophy" represents the extreme end of a scale of lesions on which there are many gradations: from the usual slight and readily reparable injury such as occurs in the average patient, to the extensive destruction of tissue in the fatal case. In livers from patients who have died from accident or disease subsequent to an attack of jaundice, little or no evidence of preceding damage has been found. All information available at present indicates that in the average patient hepatic damage is slight, and repair prompt and complete.

5. (*a*) Etiologic investigations, started in March, have been carried on in many laboratories in the Army and in laboratories of several universities and research institutes at the home stations of members of the Board and Commissions, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army. Although the outcome of some experimental inoculations made about four months ago seems to offer promise that the jaundice-producing agent may be discovered ultimately, the results to date have been negative as far as the demonstration of a transmissible agent is concerned. These negative results, however, have served to exclude a number of infectious diseases in which jaundice occurs. The outbreak of jaundice in the Army is not Weil's disease or any type of leptospiral infection. It is not a bacterial infection and has no relation to infectious mononucleosis. The disease is not yellow fever nor a modified form of yellow fever. Yellow fever virus has not been recovered from any material (blood, bile, urine, liver, etc.) from jaundice patients.

(*b*) The search for the icterogenic agent or factors producing this type of jaundice is progressing along two main lines. One of these is an attempt to transmit the disease with materials derived from patients. The other is an attempt to reproduce this type of jaundice in animals with yellow fever vaccine or its compounds. Experiments are being conducted with the whole vaccine using lot numbers known to have been associated with a high incidence of jaundice, and as control lots not associated with jaundice. On the assumption that the component of human serum in certain lots of vaccine administered up to April 18, 1942 may have carried an icterogenic agent, the donor lists are being analyzed and experimental inoculations may be made with the blood of some individuals who contributed pools of serum. Probably it will be impossible directly to attack the question as to whether the chick embryo component carried the icterogenic agent. Immunologic factors

involving the operation of an organ-specific (liver) antigen-antibody system are also being investigated.

(*c*) The serum of patients with jaundice occurring several weeks or longer after vaccination against yellow fever contains antibodies capable of neutralizing yellow fever virus. It is known from tests that jaundice has occurred in persons immune to yellow fever. On the other hand the serum of a jaundice patient who has not been injected with yellow fever vaccine does not possess these virus-neutralizing properties. These immunologic studies strengthen the conviction that another agent than yellow fever virus is the cause of the jaundice or that another process than the contact of the vaccine virus with cells is the cause of the pathologic changes in the liver.

6. (*a*) Epidemiologic investigations have been carried out to a greater or less extent at almost every location, in this country and overseas, at which an outbreak of jaundice has occurred. A mass of data in the forms of individual questionnaires and detailed studies of jaundice in troop units and at posts, camps and hospitals has been assembled at this office. With the exclusion of leptospiral and bacterial causes of jaundice the epidemiologic study has dealt chiefly with the question Is this outbreak an epidemic of infectious hepatitis (so-called catarrhal jaundice) or is it a noncontagious hepatitis following administration of yellow fever vaccine?

(*b*) Epidemics of hepatitis and jaundice with clinical and pathologic manifestations similar to the outbreak now ending have occurred among troops in the armies of many nations in the past. During the first year of the Civil War there were 10,929 reported cases with 40 deaths among Northern troops. The French have referred to the disease as the "Jaundice of Camps" and the English have often called it the "Jaundice of Campaigns." There were 2,195 cases of epidemic hepatitis in British troops in the Mesopotamian-Dardanelles region from Sept. 5 to Nov. 6, 1915. It is a common enough disease of armies and camps and of groups of young adults in civilian institutions. Recently this office has received reports of the occurrence of jaundice in British and German troops in Africa and in troops of the United Nations in the Middle East and in India. Outbreaks of jaundice in civilian communities in this country and abroad have been well described in the past and are also subjects of recent reports. That jaundice of the usual so-called catarrhal type may have occurred and may be occurring among troops of the United States Army in certain locations is unquestionable. Outbreaks of such cases among troops and civilians are characterized by an incubation period of twenty to thirty-five days or less and a spread by contact. As stated above, the number of cases of jaundice of this type in the Army appears to have been about 125 per month in the first two months of this year. No extensive outbreak of jaundice in the civil population has occurred in this country in the past year.

(*c*) The incidence of cases of hepatitis and jaundice in the present outbreak in the Army has shown the following special features:

(1) Simultaneous occurrence in troops in locations widely separated, from the Pacific to the Atlantic and from the North to the South, with notable intermediate locations.

(2) Absence of démonstrable contacts between these units.

(3) Invariable association of all large outbreaks and many small outbreaks with administration of certain lots of yellow fever vaccine.

(4) The predictable occurrence of cases of jaundice in groups of individuals, troop units and others known to have received these lots of vaccine.

(5) The predictable occurrence of a certain percentage of cases of jaundice at stations to which troops known to have received certain lots of vaccine were dispatched.

(6) The occurrence of a certain percentage of cases of hepatitis and jaundice after an incubation period of seventy to ninety days following administration of the above mentioned lots of vaccine. This incubation period has extended from about forty to one hundred and twenty days, depending on lot numbers and conditions to which the individual was exposed. A few cases may occur as long as six months after vaccination.

(7) The occurrence of large numbers of cases of jaundice in large groups of individuals vaccinated with one or the other of these lots and the occurrence of a few cases in instances in which subdivisions of the groups received these lots while the more numerous group of "contacts" free from jaundice received other lots of vaccine or were not vaccinated against yellow fever.

(8) The absence, to date, of secondary outbreaks in locations at which this type of jaundice has occurred. This has been true of places in which there were large numbers of cases following yellow fever vaccination and in places in which the patients of postvaccinal jaundice were in the midst of many times their number of nonvaccinated individuals or individuals vaccinated with nonicterogenic lots.

(9) Examples could be multiplied. They are the basis for the conclusion that this outbreak is a type of jaundice following the administration of certain lots of yellow fever vaccine and that the disease is not contagious and hence does not constitute a danger to the public health.

(*a*) When it appeared likely that the jaundice was associated with vaccination against yellow fever, the Surgeon General, early in the spring, ordered discontinuation of the vaccine then in use until problems were satisfactorily solved and a change to another source of vaccine. Since then the vaccine has been prepared without the human serum component. It is believed the risk of jaundice has been eliminated. The distribution of vaccine was limited to ports of embarkation and the Air Surgeon. Later, vaccination of troops against yellow fever was limited temporarily to military personnel traveling to or through or stationed in areas in which yellow fever is endemic. As defined by the Surgeon General, after consultation with specially informed authorities, these areas are, in the Western Hemisphere, the mainland of South America lying between latitudes 13 degrees north and 30 degrees south, including the islands immediately adjacent; in the Eastern Hemisphere, the portion of Africa lying between latitudes 16 degrees north and 12 degrees south, including the islands immediately adjacent.

(*b*) Regulations concerning vaccination against yellow fever are matters of international importance. Those in effect for the United States Army are coordinated with British regulations applicable to areas in which yellow fever is endemic or a potential hazard.

OPHTHALMIC SURGERY IN THE RUSSIAN ARMY

VLADIMIR FILATOV
Member Academy of Sciences, U. S. S. R.

NOTE.—*The following message and paper were radioed to* THE JOURNAL *from Moscow. Most of the methods discussed have been previously published. The article is printed here primarily because of the unusual circumstances associated with it.*—ED.

Sir:—With a view to establishing close cooperation in our struggle against hitlerism, we send you an article by Academician Vladimir Filatov with the request that you publish it in THE JOURNAL, *which is greatly respected by medical circles of America and Europe.*

There is no doubt that cooperation of Russian and American scientists will contribute to victory.

ACADEMICIAN DERZHAVIN,
President, Soviet of Antifascist Scientists

ACADEMICIAN PILIPCHUK,
Secretary

The vicissitudes of war have brought us from Odessa to Tashkent, where excellent conditions have been procured by the Soviet government to promote our researches. I shall mention here only the principal achievements of my school, which may prove useful for treating wounded and sick soldiers in our heroic army.

PLASTIC SURGERY BY THE ROUNDSTALK METHOD

First is my new method of plastic surgical operation by the so-called roundstalk method first described in April 1917. A similar method was suggested somewhat later by Gillies. The main essentials are as follows:

A wide band is cut from the patient's skin two or three weeks prior to surgical intervention in which it is anticipated that the existence of scars or tumors may result in the formation of some defect. Its ends are preserved intact and the margins are stitched together so that it assumes the shape of a cylindric structure or "stalk." In the course of the plastic operation one end of the stalk is cut off together with the skin fragment, the latter being grafted as a leaf on a stalk to the defect, to which it is sewn. After ten days the stalk is cut off the fragment and the operation is completed by sewing it definitely. The advantage of the round stalk method over previous methods of plastic operations is that it is fairly large, owing to the development of blood vessels, thereby securing proper nutrition of the fragment and it is protected from infection. The round stalk may be prepared far off from the site of the proposed plastic operation. It is made to approach the defect with one or another end being alternately sewn up every fortnight to skin cuts made along its path. The round stalk method has been epoch making in plastic surgery and is widely applied especially in wartime for restoration of lost or mutilated parts of the body (such as the nose, eyelids, lips, cheeks and fingers). The twenty-fifth anniversary of this method was recently celebrated by Soviet surgeons. I have dedicated this method to our heroic Red Army.

TRANSPLANTATION OF CORNEA

The second achievement of my school applied in military surgery is transplantation of the cornea to cure blindness or invalidity resulting from persistent opacity of the cornea, so-called wall eye. The latter is caused by corneal infections (by ulcerations) as well as by trauma and burns, either chemical or thermal.

The old method and technic of corneal transplantation have been essentially improved. By means of special instruments and trephines some dangerous complications of operations, including injury to the lens, can be avoided. It was shown that the cornea of cadavers' eyes kept one to three days at low temperature (a few degrees above zero) heals better in the patient's "wall eye" than that from a live donor. Thus copious source material for corneal transplantations has been discovered, the number of operations amounting now to about one thousand. Thanks to support of our government, this beneficent operation is now widely applied by Soviet ophthalmologists.

I have had the pleasure of demonstrating my methods of corneal transplantation as well as patients to our American guest physicians and former United States Ambassador Steinhardt, also to a group of English surgeons, among whom I may mention the notable Edinburgh ophthalmologist Professor Traquaire, who has also attended my operations.

TRANSPLANTATION OF TISSUE AS STIMULATOR OF BIOCHEMICAL PROCESSES

The third achievement which my school has introduced into surgical wartime practice is therapeutic application of surviving tissues of both man and animals.

I have succeeding in showing that corneal transplantation may be used not only for optic purposes but also to cure corneal infections. Particularly effective in this respect is transplantation of cadavers' corneas preserved at low temperature (three degrees above zero). For this purpose a fragment of cornea is grafted to an incomplete defect made at the margin of the patient's cornea. Further inquiry showed that almost every kind of human tissues preserved six to seven days at low temperature will exert powerful curative action. Tissues may be derived from another person (and from the cadaver) as well as from the patient himself. Animal tissues are also effective as well as some body fluids, such as aqueous humor or cerebrospinal fluid, provided they are derived from preserved cadaver or from preserved tissues and organs. For preference I use preserved skin (transplanted to a cut made in the patient's skin) as well as implantation of preserved placenta, grafting of mucosa, injection of aqueous humor from a preserved bovine eye or extracts from preserved tissues.

This method gives remarkable results in treating a number of diseases, both ocular and nonocular. Thus it has been successfully applied in tuberculosis (of the skin, throat and lungs), in treating various kinds of ulcers (particularly obstinate wounds), scars (particularly scar contractures of soldiers), lesions of the peripheral nervous system (particularly of traumatic origin), skin diseases, gynecologic disorders, arthritis and allergic diseases (bronchial asthma). Of ocular diseases I may mention corneal inflammation (tuberculosis and trachoma), infections of the choroid and retina such as chorioretinitis of the shortsighted, pigment retinitis and atrophy of the optic nerve. This

method has been tested during many years and is now widely applied for treating wounded and sick soldiers of the Red Army.

The theoretical principles underlying this method are that: Vital functions of isolated tissue kept at low temperature are preserved. This is possible only on condition that tissue undergoes some reconstruction resulting in formation of certain stimulants (accelerators) of biochemical processing going on within the organism. Stimulants (which I call "preservation factors") of tissue or tissue fluids stimulate metabolism of recipient's cells, thereby enhancing regeneration processes in the wide sense of this term.

It is of course my duty as a citizen enthusiastic, together with all Soviet people, to free my country from invasion of the enemy to introduce achievements of my school into the practice of military hospitals. This is why I deem it necessary, apart from my personal surgical obligation, to discuss the methods of our school in reports made to civil and military surgeons of Tashkent and to submit them to the attention of my American colleagues.

STANDARDS FOR MATERNITY CARE AND EMPLOYMENT OF MOTHERS IN INDUSTRY

PREPARED BY THE CHILDREN'S BUREAU AND THE WOMEN'S BUREAU OF THE U. S. DEPARTMENT OF LABOR IN CONSULTATION WITH:

MRS. DOROTHY J. BELLANCA, Amalgamated Clothing Workers of America, New York.
MISS ELIZABETH NORD, Textile Workers Union of America, Providence, R. I.
MISS ROSE SCHNEIDERMAN, New York State Department of Labor, New York.
DR. H. CLOSE HESSELTINE, Department of Obstetrics and Gynecology, University of Chicago School of Medicine, Chicago.
DR. N. J. EASTMAN, Department of Obstetrics, Johns Hopkins University School of Medicine, Baltimore.
DR. JAMES G. TOWNSEND, Division of Industrial Hygiene, National Institute of Health, Bethesda, Md.
MISS ELEANOR RANTOUL, Industrial Hygiene Bureau, Metropolitan Life Insurance Company, New York.

GENERAL STATEMENT

With increased employment of women in industry, the problem of protection of the pregnant woman and her child has become more urgent. Many inquiries have come to the Women's Bureau and to the Children's Bureau from a variety of sources, such as employers, workers and health departments, concerning the types of work suitable for pregnant women and the policy of maternity leave. The labor situation in this country does not necessitate the recruitment or employment of pregnant women or women with infants. A woman who is expecting a child should give first consideration to her own health and to plans for safeguarding the health and care of the child. Because some women who are pregnant or who have young children may find it necessary to work, the following statement of policy has been formulated to serve as a working basis for those concerned with this problem. It is recognized as a general pol y that provisions for maternity care and leave should not jeopardize the woman's job or her seniority privileges.

EMPLOYMENT POLICIES AND CARE FOR PREGNANT WOMEN

These recommendations are based on the premise that, to safeguard the pregnant woman who works, certain special provisions should be made. She should have opportunity for adequate antepartum care. She needs sufficient time off before delivery to allow her to be in a rested state at the time of delivery and to prevent undue strain in the latter part of pregnancy. If she is employed in certain occupations that involve hazards or strain, or if complications of pregnancy occur, she needs special consideration. It is not possible to lay down hard and fast rules that will fit every situation. The wide variation in general physical condition and in the amount of home duties performed outside working hours necessitates some individualization of arrangements for maternity leave and protection.

The following general recommendations are made as a guide:

1. Facilities for adequate antepartum medical care should be readily available for all employed pregnant women, and arrangements should be made by those responsible for providing antepartum care so that every woman will have access to such care. Local health departments should make available to industrial plants the services of antepartum clinics; and the personnel management or physicians and nurses within the plant should make available to employees information about the importance of such services and where they can be obtained.

2. Pregnant women should not be employed on a shift including the hours between 12 midnight and 6 a. m. Pregnant women should not be employed more than eight hours a day or more than forty-eight hours a week, and it is desirable that their hours of work be limited to not more than forty hours a week.

3. Every woman, especially a pregnant woman, should have at least two ten minute rest periods during her work shift, for which adequate facilities for resting and an opportunity for securing nourishing food should be provided.

4. It is not considered desirable for pregnant women to be employed in the following types of occupation, and they should, if possible, be transferred to lighter and more sedentary work:

(*a*) Occupations that involve heavy lifting or other heavy work.

(*b*) Occupations involving continuous standing and moving about.

5. Pregnant women should not be employed in the following types of work during any period of pregnancy but should be transferred to less hazardous types of work.

(*a*) Occupations that require a good sense of bodily balance, such as work performed on scaffolds or stepladders, and occupations in which the accident risk is characterized by accidents causing severe injury, such as operation of punch presses, power driven woodworking machines or other machines having a point of operation hazard.

(*b*) Occupations involving exposure to toxic substances considered to be extra hazardous during pregnancy, such as:

Aniline.
Benzene and toluene.
Carbon disulfide.
Carbon monoxide.
Chlorinated hydrocarbons.
Lead and its compounds.
Mercury and its compounds.
Nitrobenzene and other nitro compounds of benzene and its homologues.
Phosphorus.
Radioactive substances and x-rays.
Turpentine.

Other toxic substances that exert an injurious effect on the blood forming organs, the liver or the kidneys.

Because these substances may exert a harmful influence on the course of pregnancy, may lead to its premature termination or may injure the fetus, the maintenance of air concentrations within the so-called

maximum permissible limits of state codes is not, in itself, sufficient assurance of a safe working condition for the pregnant woman. Pregnant women should be transferred from workrooms in which any of these substances are used or produced in any significant quantity.

6. A minimum of six weeks' leave before delivery should be granted, on presentation of a medical certificate of the expected date of confinement.

7. At any time during pregnancy a woman should be granted a reasonable amount of additional leave on presentation of a certificate from the attending physician to the effect that complications of pregnancy have made continuing employment prejudicial to her health or to the health of the child.

EMPLOYMENT POLICIES AND CARE FOR THE MOTHER AND INFANT AFTER DELIVERY

To safeguard the mother's health she should be granted sufficient time off after delivery to return to normal and to regain her strength. The infant needs her care, especially during the first year of life. If it is essential that she return to work, the following recommendations are made:

1. All women should be granted an extension of at least two months' leave of absence after delivery.

2. Should complications of delivery or of the postpartum period develop, a woman should be granted a reasonable amount of additional leave beyond two months following delivery, on presentation of a certificate to this effect from the attending physician.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

1. MEMORANDUM FOR ADMINISTRATORS OF HOSPITALS APPROVED FOR INTERNSHIPS AND/OR RESIDENCIES

The directing board of the Procurement and Assignment Service has addressed the following memorandum to the administrators of all hospitals approved for internships and/or residencies:

The directing board has appointed the following hospital administrators to serve on an advisory Committee on Hospitals: Dr. M. T. MacEachern, associate director, American College of Surgeons, Chicago, chairman; Dr. Claude W. Munger, director, St. Luke's Hospital, New York; Dr. Benjamin W. Black, medical director, Alameda County Institutions, and superintendent, Alameda County Hospital, California; Dr. Lucius Roy Wilson, superintendent, Hospital of Protestant Episcopal Church, Philadelphia, and Dr. Basil C. MacLean, director, Strong Memorial Hospital, Rochester, N. Y., and president, American Hospital Association.

This committee has recommended, and the directing board has approved, the following procedures and criteria to be used in preparing the revised lists of essential hospital staff members:

The many changes which have occurred in appointments of hospital interns and residents on or about July 1 and the urgent need of the armed forces for young medical officers make necessary at this time a revision of the lists of essential personnel on hospital staffs. Believing that you will prefer to make voluntary reductions in your staff, we ask for your fullest cooperation in our effort to assist you in maintaining your minimum essential staff.

Each hospital administrator has a definite responsibility to provide the necessary medical services for the patients of his hospital. In many hospitals, particularly those which care for charity patients and which are affiliated with medical schools, the retention of a minimum resident staff is essential both for the care of the patients and for medical education. Nevertheless, it is obvious that drastic reductions in the peacetime staffs of hospitals must be made if the needs of the armed forces are to be met.

Analysis of the original lists of essential personnel in hospitals indicates that in many institutions further reductions can and should be made. In preparing these lists the attitude should be not "How many can we possibly retain?" but "How many can we possibly release for service with the armed forces?"

1. In compiling lists consider only full time staff members, part time staff members conducting essential hospital services (e. g. roentgenologist), visiting staff members who actually conduct ward work, residents and interns.

(*a*) Residents should be considered essential on the basis of general hospital work and not because of the service they render in the care of private patients, except as it contributes to their training.

(*b*) Individuals who have completed one year of internship shall be considered available for military service unless they are appointed to an essential position as a hospital resident.

2. Do not consider visiting or courtesy staff members who serve only private patients. Their essentiality will be determined by the local Procurement and Assignment committees on the basis of their services to the community as a whole rather than their need in any particular hospital.

3. The residency program must be drastically curtailed and the number of residents decreased in numbers.

4. Subsequent to July 1, 1942 and during the war emergency, designation of a man as an essential hospital resident or fellow should not exceed two years beyond the completion of one year's internship.

5. Having determined the minimum number of essential positions, these positions should be filled as far as possible by:

(*a*) Women.

(*b*) Young men physically ineligible for military duty and older men.

6. Visiting staff members should be asked to contribute additional hours to their duties in the hospital.

7. Routine work of residents and interns should be delegated as much as possible to qualified nonmedical personnel for clerical, laboratory and other services.

8. One copy of the revised hospital list should be sent to the state chairman of the Procurement and Assignment Service and one copy to this office within one week of the receipt of this letter. A sample form for this report is enclosed.

9. It is important that every hospital staff member be informed by the hospital as to classification as essential or available, subject to approval by the Procurement and Assignment Service.

10. Your continued cooperation in this effort on the part of the Procurement and Assignment Service to provide medical personnel for the armed forces and at the same time to maintain essential hospital services during the war will be appreciated.

A blank is provided on which hospital administrators are requested to furnish full information regarding all staff members.

2. CRITERIA FOR DETERMINATION OF ESSENTIAL PHYSICIANS IN INDUSTRIAL MEDICINE

The situation regarding recruitment of physicians now employed in industrial medicine has caused the directing board of the Procurement and Assignment Service to send the following memorandum to all state chairmen relative to the methods by which the essentiality of physicians engaged in industrial medicine may be determined:

A serious situation is developing in some states because physicians under 45 years of age who are essential in their present positions as key men in industrial practice are being declared available by state chairmen or are being approached directly by recruiting boards with instructions to apply for a commission in the Army Medical Corps.

The Selective Service System and the Surgeon Generals of the Army and of the Navy are cooperating with us to keep at their posts the physicians declared to be essential by our state committees. In determining essentiality, please be guided by the following criteria, which have been recommended by the Committee on Industrial Health and Medicine and have been approved by the directing board.

In some instances an industrial physician under 37 years of age will be deemed essential according to these criteria, and yet you may think he should be made available. In this case it is your responsibility to obtain a replacement and to notify the central office at once when the industrial physician will be available.

A physician employed in industry is deemed to be essential when the following conditions exist:

A. Full time industrial physician.

1. The physician is employed by an industry which is manufacturing war materials exclusively or under priority ratings, and

2. The physician gives his full time to the industry or forty or more hours weekly, has been so employed for at least two years, or is especially trained for that purpose and is carrying on an acceptable health maintenance program and

3. The physician is performing the function of a medical director or department head or of a specialist or is the only physician employed.

4. Assistant physicians who perform routine functions under direction and are employed on a full time basis are deemed essential until they can be replaced within a reasonable time (three to six months).

B. Part time industrial physician.

1. The physician serves part time two or more industries engaged exclusively in the manufacture of war materials or under priority ratings, provided his total part time service is the equivalent of forty or more hours weekly. Note: The physician who serves on call only is not deemed to be essential.

C. The physician serves a state industrial hygiene bureau on a full time basis.

ORGANIZATION OF EMERGENCY BASE HOSPITALS

The following statement from the Surgeon General, U. S. Public Health Service, has just been sent to a selected group of medical schools and hospitals:

Selected hospitals and medical schools in the coastal states have been invited by the Surgeon General of the U. S. Public Health Service to organize affiliated staff units which will be ready to serve when needed to supplement the medical staffs of emergency base hospitals now being designated by the Medical Division of the Office of Civilian Defense.

These units resemble the affiliated hospital units of the Army, except that they are smaller. They are being organized in order to assure suitable status and remuneration for physicians who may be called on in the event of an enemy attack in their locality to care for casualties and other patients who have been evacuated to the interior of their region.

The designation of emergency base hospitals and the formation of affiliated units are part of a joint hospital program of the Medical Division of the Office of Civilian Defense and the U. S. Public Health Service. The program is authorized under an agreement concluded March 2, 1942 between the Federal Security Administrator and the director of the Office of Civilian Defense.

Physicians in the affiliated units will be commissioned in the inactive Reserve Corps of the Public Health Service. Unless an urgent need for their services should arise, they will remain on an inactive status for the duration of the war. They will be called to active service only if hospitals in their regions must be evacuated and the civilian populations must be moved because of military necessity. Activation of the units will take place by order of the Surgeon General at the request of the chief medical officer of the Office of Civilian Defense on advice of the regional medical officer and the state chief of Emergency Medical Service in charge of the affected areas.

The commissions will be in grades ranging from Passed Assistant Surgeon to Senior Surgeon, and, when units are activated, these officers will have the rank, pay and allowances equivalent to those of officers in the armed forces. The accompanying table of organization shows the composition of the unit.

Institutions invited to form units are asked to nominate an outstanding physician or surgeon as unit director, who, if he meets the physical and other requirements, will be commissioned Senior Surgeon in the Public Health Service Reserve. The unit director will then nominate the remainder of the staff, and appointments will be made after clearance through the state chief of Emergency Medical Service. Nominations are to be limited to male physicians over 45 years of age, to those under that age who have physical disabilities which disqualify them for military service, but which do not interfere with their professional activities, and to women physicians.

In order to avoid serious depletion of the professional staffs in the medical schools and hospitals of the target areas, the Surgeon General has recommended that medical schools draw their affiliated units in part from associated hospitals and that nonteaching hospitals invite physicians from other qualified hospital staffs to collaborate.

Organization for U. S. Public Health Service-Office of Civilian Defense Affiliated Units

Number Required	Position in Unit	USPHS Title	Equivalent Army Rank
1	Chief of medical services	Senior Surgeon *	Lieutenant Colonel
1	Assistant chief of medical services	Surgeon	Major
2	General internists	Passed Assistant Surgeon or Surgeon	Captain or Major
1	Chief of surgical services	Senior Surgeon *	Lieutenant Colonel
1	Assistant chief of surgical services	Surgeon	Major
2	General surgeons †	Surgeon	Major
2	General surgeons †	Passed Assistant Surgeon or Surgeon	Captain or Major
1	Orthopedic surgeon	Surgeon	Major
1	Assistant orthopedic surgeon	Passed Assistant Surgeon or Surgeon	Captain or Major
1.	Dental surgeon	Passed Assistant Surgeon or Surgeon	Captain or Major
1	Pathologist	Passed Assistant Surgeon or Surgeon	Captain or Major
1	Radiologist	Passed Assistant Surgeon or Surgeon	Captain or Major
15			

* One of the two senior surgeons will be the unit director.
† In place of one or more of the general surgeons, a urologic surgeon, thoracic surgeon, neurosurgeon or plastic surgeon may be included.

DR. ROY HALLORAN ON DUTY IN SURGEON GENERAL'S OFFICE

Dr. Roy D. Halloran, superintendent, Metropolitan State Hospital, Waltham, Mass., has been commissioned lieutenant colonel in the U. S. Army and assigned to duty as consultant in neuropsychiatry in the Surgeon General's Office, Washington, D. C. Dr. Halloran, who assumed his new duties on August 17, will coordinate the neuropsychiatric service in the army both in this country and overseas. He was born in Massachusetts in 1894 and graduated from Columbia University College of Physicians and Surgeons in 1920. He has developed postgraduate courses in psychiatry and neurology, engaged in research and in 1935 organized the Child Guidance Clinic in Waltham.

ORGANIZATION SECTION

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Change in Status.—S. 2676 has passed the Senate, to provide for medical care and funeral expenses for certain members of the Naval Reserve Officers' Training Corps.

Bills Introduced.—S. 2726, introduced by Senator Clark, Missouri, proposes to make available to veterans of the present war the medical and hospitalization benefits now accorded to veterans of World War No. 1. S. 2738, introduced by Senator Barkley, Kentucky, for Senator George, Georgia, and H. R. 7503, introduced by Representative Doughton, North Carolina, propose to amend Title V of the Social Security Act relating to grants to states for maternal and child welfare so as to authorize such additional sums as may be necessary to extend and improve services for maternal and child health, for crippled children and for child welfare. The President, in submitting this legislation to Congress, indicated that an additional appropriation of $7,500,000 would be required for the first year to carry out the purposes of the bill. The bill, if enacted, will be in effect for the duration of the present war and for a period of six months thereafter. The Acting Administrator of the Federal Security Agency has transmitted to the Congress a draft of proposed legislation to reorganize and redefine the duties of the United States Public Health Service.

DISTRICT OF COLUMBIA

Bill Introduced.—H. R. 7506, introduced by Representative Randolph, West Virginia, proposes to amend the law relating to registration of births in the District of Columbia by providing, among other things, for the delayed registration of a birth, for the issuance of a certificate of birth where a child of unknown parentage is adopted and for the issuance of a birth certificate in case the paternity of a child is unknown.

MEDICAL ECONOMIC ABSTRACTS

TUBERCULOSIS ON THE WAY OUT?

A mortality summary for the U. S. registration states on tuberculosis of the respiratory system issued by the Bureau of the Census, July 17, lends considerable encouragement to those who believe that, within a now appreciable time, tuberculosis will join a number of other destructive plagues as of interest only to medical historians. The registration area was not completed until 1933. The states added between 1900 and 1933 were often among those having the highest mortality rates, yet since 1900 the tuberculosis mortality rate has fallen from 174.5 per hundred thousand of population to 42.2. This means a reduction of a little over 75 per cent during this century.

Since 1933, when the registration area first included the entire United States, in spite of the increase in population the decline in the absolute number of deaths from tuberculosis has been continuous, from 67,422 deaths in 1933 to 55,576 in 1940.

Further encouragement is offered by the fact that in certain states and in some whole sections of the country the present death rate is very much lower than the average for the whole United States. In the entire West North Central division, embracing seven states, the rate in 1940 was 26.3. There are fourteen states in which less than 30 out of every 100,000 died from tuberculosis of the respiratory system in the latter year. The decline has been continuous for all ages and both sexes, and, while the rate for Negroes is still almost three times as high as for white persons, the rate of decline has in recent years been about the same for the two races. The expansion of institutional care is shown by the fact that only 44 per cent of the deaths in 1940 took place outside some institutions.

ADDITIONAL AMERICAN FIGHTERS

Better health care has added a powerful force of 2,800,000 men, equal in number to the entire United States draft army of 1917-1918, and double the number of those who saw service in France, to the military and productive strength of the nation, according to the statisticians of the Metropolitan Life Insurance Company.

About 11 per cent of the 25,800,000 men at present in the draft ages 20 to 44 would not be living if mortality conditions of 1900 had prevailed until the present time. In fact, some of the men now living would never have been born, because their parents would have been among the victims of the higher mortality as of 1900.

The statisticians say "What is perhaps not generally realized is that a very considerable part of our fighting force and industrial productive force is the direct result of reduced mortality since the beginning of the century, and this in turn is to be credited to our organized public health effort and the remarkable advances of medical science in those decades."

NURSES WANTED FOR WAR

The 1942 census in the United States reported 369,287 "trained nurses" in the United States. A national inventory of registered nurses in 1941 found that 173,055 were actively engaged in nursing practice. Nurses are eligible for military duty only if they are under 40 years of age and unmarried, and only 89,327 met this requirement. To this, however, must be added 9,366 who were qualified but were not in active nursing work. This would give approximately 100,000 eligible for military duty.

Nursing schools reported an increased enrolment in 1942 of approximately 8,000 students. The nurses are determined to meet the war situation without lowering standards, preparation and service. Some of the ways suggested at the state board conference held immediately following the biennial conference of the nursing association were that students' vacations be cut or eliminated and that the forty-four hour week be retained and more students admitted in preference to lengthening the hours per week with a smaller number of students. It has been found in some cases that to admit smaller classes three or four times a year is not as disrupting as to admit one large class. Federal grants and existing scholarship funds permit an increase in the number of tuition scholarships.

Expansion of auxiliary nurses' services also offers a method of increasing the effectiveness of full trained nurses.

The present situation is summed up as follows:[1]

"It seems to me that a survey of the situation confronting us leads to a few simple but ineluctable conclusions:

"1. Subsidiary workers on different levels and volunteers may help in great measure to give nursing service, but there is no substitute for the well trained nurse in the administration of nursing care.

"2. The maintenance of nursing care may be achieved by

"(*a*) Using for nursing care many of the hours now spent in activities classed as nursing service.

"(*b*) Eliminating the physical and the administrative factors which waste nurses' time and energy.

"(*c*) Fixing living conditions and salaries for nurses on a level which will keep nurses in the hospitals."

This item is based on material contained in the American Journal of Nursing, July 1942, and especially on the work of the biennial session of the American Nursing Association, which opened in Chicago in May 1942.

1. McIver, Pearl: Registered Nurses in the U. S. A., Am. J. Nursing **42**:784 (July) 1942.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Personal.—Dr. Aaron J. Rosanoff, Sacramento, resigned as director of state institutions effective July 1. Dr. Rosanoff has held the position since 1939.——Dr. William B. Wallace, Rochester, Minn., has been appointed clinical instructor in surgery at the Stanford University School of Medicine, San Francisco.

New School of Humanities at Stanford.—The establishment of a School of Humanities at Stanford University has been made possible in part by a grant of $47,500 from the Rockefeller Foundation. The new school will begin operation in September. Mr. Lewis Mumford, New York, author, will be the professor of humanities; the assistant professors will be Arthur E. Bestor and Jeffery Smith of Columbia University and Desmond E. Powell of the University of Arizona. According to an announcement from the school, in these times it is significant that Stanford University should be emphasizing not only the war effort but also the necessity of facing constructively the whole business of American culture and the necessity for maintaining unshaken that which we are in the very process of defending. John W. Dodds, Ph.D., professor of English at Stanford, has been named dean of the new school.

DISTRICT OF COLUMBIA

Luncheon Meetings Proposed.—The Medical Society of the District of Columbia has under consideration a plan to replace some of the regular evening meetings during the year with luncheon sessions. It is believed that practitioners are too tired carrying on their practices as well as the many activities the present emergency demands of them to enjoy evening meetings.

Dr. Armstrong Returns to Washington.—Dr. Charles Armstrong, director of the Division of Infectious Diseases, National Institute of Health, Bethesda, Md., has arrived in Washington to be a patient at the United States Naval Hospital, newspapers reported. Dr. Armstrong is recovering from a severe attack of tularemia. He was reported ill with the disease shortly after arriving at the Rocky Mountain Spotted Fever Laboratory of the U. S. Public Health Service at Hamilton, Mont.

IDAHO

State Medical Meeting at Sun Valley.—The Idaho State Medical Association will hold its annual session in Sun Valley, September 17-19, under the presidency of Dr. Paul M. Ellis, Wallace. The following members of the faculty of the University of Oregon Medical School, Portland, will participate:

Dr. Frank R. Menne, Pathology of Lymph Nodes; Pathology of the Prostate Gland and Pathology of Cancer of the Stomach.

Dr. Raymond E. Watkins, Management of Hemorrhage in the Latter Half of Pregnancy; Cancer of the Uterus and Treatment of Prolapse of the Uterus.

Dr. Lyle B. Kingery, Present Status of Superficial Fungous Infections of the Skin; Five Day Treatment of Syphilis and Dermatological Problems of the General Practitioner.

Dr. Joseph B. Bilderback, Surgical Conditions of the Abdomen in Infants and Children (with Dr. Gius); March of Pediatrics and Vomiting in Infancy.

Dr. Edwin E. Osgood, Principles of Chemotherapy; Differential Diagnosis of Coma and Therapeutic Thinking.

Dr. John A. Gius, Surgical Conditions of the Abdomen in Infants and Children (with Dr. Bilderback); Cancer of the Colon and Considerations in Treatment of War Wounds.

ILLINOIS

Dr. Boyd Named Acting Director.—Dr. Richard F. Boyd, assistant to the chief of the division of local health administration, state department of health, was appointed acting chief of the division, effective July 1. He fills the vacancy that occurred when Dr. Hugo V. Hullerman resigned as chief to become deputy commissioner of health and director of maternal and child health of the Peoria Department of Health. Dr. Boyd has been associated with the Municipal Contagious Disease Hospital in Chicago, the Kansas State Board of Health and more recently with the Farm Security Administration as regional medical officer in Michigan, Wisconsin and Minnesota.

Chicago

Dr. McGuigan Retires.—Dr. Hugh A. McGuigan has retired as professor of pharmacology and therapeutics at the University of Illinois College of Medicine, effective September 1. Dr. McGuigan was born in Ireland in 1874. He received his degree of doctor of philosophy at the University of Chicago in 1905, graduating at Rush Medical College three years later. He has served on the staffs of the North Dakota Agricultural College, Fargo, University of Chicago and Northwestern University Medical School and since 1917 has held a professorship at Illinois.

MAINE

Home Study Courses.—The Maine Medical Association, at its annual meeting in June, approved a program of home study courses in the specialties, to be available to members on application to Dr. Frederick R. Carter, 142 High Street, Portland. Committees of recognized specialists will have charge of the courses. Physicians may apply for one or more of the courses, and material will be sent out periodically to each applicant. The program aims to assist in organized reading, suggest pertinent up to date subjects with which the physician should be conversant and provide ready references in the literature.

MICHIGAN

Blood Plasma Banks.—Plans are under way to establish blood banks at centers throughout the state for the collection of blood for processing at the state department of health laboratories in Lansing. When a supply has been built up, blood plasma will be made available without cost wherever needed. It is hoped to have the general program in operation by Thanksgiving.

Five Deaths in Diarrhea Epidemic.—Five patients in the indigent unit in the Eloise Hospital, Detroit, were reported dead and 28 others seriously ill in an outbreak of infectious diarrhea, newspapers reported on August 17. All the patients in the indigent ward were isolated as efforts were made to locate a carrier who was believed to have been responsible for the epidemic.

Memorial Hospital Remodeled.—The James W. Sheldon Memorial Hospital has been remodeled and refurnished with funds supplied by the city of Albion and the W. K. Kellogg Foundation. An official opening took place on August 9. The hospital, which is owned and operated by the city of Albion, was established in 1924. Its origin, however, began with the establishment of the Wade Hospital in a private home in 1907.

Poliomyelitis Consultation Service.—The Michigan Crippled Children Commission will again this year establish poliomyelitis consultation service for physicians desiring it for cases or suspected cases of poliomyelitis in children from birth to 20 years of age inclusive, when the family is financially unable to provide this service and when consultation is not furnished locally. The service will be available until December 1. Dr. Carleton Dean, Lansing, is director of the service.

New Regulations of State Health Council.—Regulations approved by the state council of health at a recent meeting prohibit the fitting of shoes to stockingless feet and of foundation garments to women who do not wear underslips, the importation of parrots, parakeets and love birds, and the reuse of metal bottle caps having porous linings. According to *Michigan Public Health*, the increase in imports of psittacine birds which may transmit so-called parrot fever promoted the readoption of a regulation first having effect in February 1939.

MINNESOTA

Hospital for Kenny Treatment of Infantile Paralysis.—St. Barnabas Hospital announces the opening of the Sheltering Arms Hospital, Minneapolis, for the exclusive care of patients with infantile paralysis under the Sister Kenny treatment. The Sheltering Arms Hospital was established in 1882 as a home for orphaned and dependent children. The present accepted theory of placing orphaned children with families rather than in institutions has lessened the social usefulness of this institution, and a decision to devote it to the Sister Kenny treatment ends a series of negotiations involving the trustees of the Sheltering Arms Hospital, the board of directors of the St. Barnabas Hospital and the War Production Board. The hospital is located on a 29 acre tract, and construction on the remodeling of the building will start immediately. Privately interested persons have already given the $30,000 which is needed at present to finance the project. It is expected that the hospital will be in operation some time in September. A special wing will be devoted to patients in the initial and contagious stages of the disease. St. Barnabas

will operate Sheltering Arms, and Dr. Wallace H. Cole, professor and director of the department of orthopedic surgery, and Dr. Miland E. Knapp, head of the department of physical therapy, University of Minnesota Medical School, Minneapolis, will be in charge of the staff.

MONTANA

State Medical Election.—Dr. John P. Ritchey, Missoula, was named president-elect of the Medical Association of Montana at its annual meeting in July. Drs. Ernest D. Hitchcock, Great Falls, was installed as president and Arthur C. Knight, Philipsburg, vice president. Dr. Thomas F. Walker, Great Falls, is the secretary. The 1943 session will be held at Billings.

NEBRASKA

Tenth Annual Clinical Assembly.—The Omaha Mid-West Clinical Society will conduct its tenth annual clinical assembly at the Hotel Paxton, Omaha, October 26-30. One session will be devoted to a consideration of "Newer Concepts Regarding Hypertension and Its Treatment." The preliminary program lists the following physicians as speakers:

Frederic W. Bancroft, New York.
Samuel Iglauer, Cincinnati.
William J. Dieckmann, Chicago.
Irvine H. Page, Indianapolis.
Elmer L. Sevringhaus, Madison.
Russell L. Haden, Cleveland.
Frank H. Lahey, Boston.
Herman H. Riecker, Ann Arbor, Mich.
Philip D. Wilson, New York.
Arild E. Hansen, Minneapolis.
Francis E. Senear, Chicago.
Temple S. Fay, Philadelphia.
Harry M. Weber, Rochester, Minn.

NEW JERSEY

Housing Project Quarantined for Infantile Paralysis.—Seth Boyden Court, Newark's second largest housing project with 530 families with about 1,000 children, was placed under quarantine on August 15 after 3 children of residents there were stricken with infantile paralysis. According to the New York *Times*, the order permitted adult workers and shoppers to enter and leave their homes but children were to be confined within limits of the project for twenty-one days. No family will be permitted to have visitors. The quarantine was ordered by Dr. Charles V. Craster, health officer of Newark. Notices were posted at 8 o'clock in the morning, and nurses and physicians began an immediate check on children in the buildings. Two of the cases were reported early the previous week and the third was confirmed on Friday, August 14. The stricken children, 4, 5 and 7 years of age, were taken to Essex County Hospital for Contagious Diseases, Belleville. Dr. Craster said the cases might have resulted from 13 cases of poliomyelitis that caused two deaths in Union County in recent weeks. The New Jersey state health department described the state situation as normal in reporting a total of 35 cases in eight counties, most of them in Union County, since July 1 and a total of 44 since January 1.

NEW YORK

Research Program in Cancer.—The establishment of a research project is now being contemplated by the Westchester Cancer Committee, according to the *Westchester Medical Bulletin*. It is hoped to obtain a starting fund of $5,000 to begin the work early this fall. Dr. Gilbert Dalldorf, Valhalla, chief pathologist at Grasslands Hospital, has been appointed chairman of a newly appointed committee on research to carry out the project.

Course in Tuberculosis.—The Trudeau School of Tuberculosis announces its twenty-eighth session, September 14-October 9, at Saranac Lake and a supplementary course, October 12-23, at Bellevue Hospital, New York. Students completing the four weeks at Saranac Lake may take the extra study in New York without additional charge. The general plan aims to present the essentials of history, etiology, epidemiology, pathology, diagnosis, prognosis and treatment during the four weeks at Saranac Lake. Emphasis is placed on bedside teaching and the clinical study and treatment of patients combined with x-ray and pathologic conferences. The course at Bellevue is planned to afford a survey of the diseases of the chest as they are encountered in practice. Pathology and pathogenesis will be illustrated with specimens of morbid anatomy and with clinical cases.

New York City

Chinese Science Society.—The Science Society of China, organized at Cornell University in 1914 and later established in China, has formed a New York chapter to promote better understanding and cooperation among Chinese research workers in the United States. Among the chapter officers are John Y. C. Watt, president; Chek M. Soo-Hoo, vice president, and Dr. Katherine Li, member of the committee.

Dr. Wegman Appointed Director of Research.—Dr. Myron E. Wegman, assistant professor of child hygiene in the School of Tropical Medicine, San Juan, Puerto Rico, has been appointed director of training and research in the bureau of child hygiene of the city department of health. Dr. Wegman filled the vacancy left when Dr. Albert S. McCown resigned to become medical director of the American Red Cross. Dr. Wegman graduated at Yale University School of Medicine, New Haven, in 1932 and served for a time as pediatric consultant in the Maryland State Department of Health.

Ledyard Fellowship Available.—The Society of the New York Hospital announces the Lewis Cass Ledyard Jr. Fellowship, which is available to an investigator in the fields of medicine and surgery or in any closely related field. Preference will be given to younger applicants who are graduates of medicine and who have demonstrated fitness to carry on research of high order. The fellowship was established in 1939 in honor of Lewis Cass Ledyard Jr., governor of the New York Hospital. The income amounts to approximately $4,000 annually; $3,000 will be used as a stipend and about $1,000 for supplies for research. Applications for the fellowship should be in the hands of the committee by December 15, and it is expected that the award will be made by March 15 and the fellowship itself to be available July 1. Applications should be addressed to the committee of the Lewis Cass Ledyard Jr. Fellowship, Society of the New York Hospital, 525 East Sixty-Eighth Street, New York.

OREGON

Industrial Hygiene Unit.—Plans have been under way to establish an industrial hygiene unit in Oregon. According to *Industrial Hygiene* Dr. Harold T. Castberg, formerly acting chief of the Industrial Hygiene Service of California at Berkeley, and Mr. E. T. Chanlett, his associate, are organizing the unit in the state, which thus far has not provided health services for its industrial workers.

Annual Session Limited to Meeting of House of Delegates.—The Oregon State Medical Society, in view of the present emergency, has decided to limit this year's annual session to meetings of the house of delegates and the general society to transact necessary annual business. The meeting will be held in Portland, September 12-13. The program of papers has been canceled, with the exception of those contributed through the courtesy of the Portland Academy of Medicine to be presented by Dr. George Fahr, professor of internal medicine, University of Minnesota Medical School, Minneapolis. The titles of the lectures are "What Is Congestive Heart Failure?" "The Rational Treatment of Congestive Heart Failure" and "The So-Called Irritable Heart of the Soldier."

PENNSYLVANIA

Dr. Schneider Wins Scholarship in Tuberculosis.—Dr. Benjamin Schneider, Danville, was recently chosen by the Pennsylvania Tuberculosis Society as the recipient of its annual scholarship at the Trudeau School for Tuberculosis at Saranac Lake, New York. The scholarship is always given to a physician in general practice. Dr. Schneider, who graduated at the University of Pennsylvania School of Medicine, Philadelphia, in 1933, has engaged in general practice in Danville and surrounding rural territory the past eight years. He was president in 1940 of the Montour County Medical Society. In addition to this scholarship, Dr. Schneider has been awarded one of the annual scholarships of the Trudeau School in an amount sufficient to cover the tuition fee. The course will open this year on September 14 and as usual will run four weeks at the school with the privilege of two additional weeks at the Bellevue Hospital in New York.

Philadelphia

Personal.—Dr. William H. Schmidt has been appointed associate professor of physical therapy at Jefferson Medical College of Philadelphia.——Dr. Alfred N. Richards, professor of pharmacology, University of Pennsylvania, has been elected a foreign member of the Royal Society of London, according to *Science*.

Two Million Dollar Bequest to Cancer Institute.—Lankenau Hospital Cancer Research Institute will receive nearly $2,000,000 from the estate of Mrs. Anna C. Burr, who died on March 6. The bequest, which will be used for the study of cancer, will serve as a memorial to Mrs. Burr's husband, Edward H. Burr, who died in 1922.

Pittsburgh

New Psychiatric Hospital.—The state department of welfare announces the opening soon of the Western State Psychiatric Hospital on the campus of the University of Pittsburgh. The purposes of the hospital will be the treatment of patients, research in neurology and psychiatry, training of medical students, physicians and workers in allied fields. The hospital will accommodate 250 beds. Eight floors have been set aside for the care of psychotic adults and children.

TEXAS

Radiologist Honored.—A bronze plaque was presented to Dr. James M. Martin, Dallas, on June 5 by Major Glenn D. Carlson, M. C., U. S. Army, Fort Sam Houston, on behalf of the Texas Radiological Society in appreciation of his fifty years' service in the practice of medicine and particularly to mark his activities in the field of radiology. The presentation was made in Dr. Martin's room in Baylor University Hospital, where he had been a patient for several weeks, according to the state medical journal. Earlier in the year the society had adopted a resolution paying tribute to Dr. Martin.

Portraits Presented to Medical School.—Portraits of Drs. William S. Carter and the late Harry O. Knight, purchased by the University of Texas Medical Alumni Association, were recently presented to the University of Texas Medical Branch, Galveston. Dr. Carter was appointed to the school in 1897 as professor of physiology; he served as dean from 1903 to 1922 and again from 1935 to 1938. Dr. Knight graduated at the school in 1907 and joined the faculty in 1909 as demonstrator of pathology, bacteriology and anatomy. He was adjunct professor of anatomy from 1914 to 1923, when he became professor of anatomy, a position he held at the time of his death in 1939.

VIRGINIA

Physician President of Chamber of Commerce.—Dr. Huston St. Clair, Tazewell, was recently chosen president of the Virginia State Chamber of Commerce. Dr. St. Clair graduated at the University of Pennsylvania School of Medicine, Philadelphia, in 1926. One of his first projects will be to name a committee to carry out the long time study of the state educational system in relation to the needs and to the progress of education in other states, newspapers report.

Legislative Committee Appointed to Study Medical Licensure.—On March 9 Governor Darden approved a joint resolution passed by the general assembly creating a commission to develop a comprehensive plan for examining and licensing persons seeking to practice any branch of the healing art in Virginia and for preventing unqualified persons from so practicing. This commission is to report its findings and recommendations to the general assembly at least sixty days before the convening of the next regular session. The joint resolution provides that this commission shall be composed of seven members, two to be appointed by the president of the senate from the members of the senate, three by the speaker of the house of delegates from the members of the house and two by the governor. All appointments have now been made. Governor Darden appointed Dr. Edgar Gammon, president of Hampden-Sydney College, and Lawrence Peyton of Staunton as two members. The president of the senate appointed Senator James D. Hagood of Colover and Senator Garland Gray of Waverly. The speaker of the house of delegates appointed the following members of the house to serve on the committee: Stuart B. Campbell of Wytheville, John B. Boatwright of Buckingham and Walter H. Scott of Roanoke.

WEST VIRGINIA

Society News.—Dr. Andrew E. Amick, Charleston, discussed "Infantile Diarrhea, with Special Consideration as to Differential Diagnosis and Treatment," before the Fayette County Medical Society in Montgomery, June 16.——The Cabell County Medical Society was addressed in Huntington on June 11 by Dr. Ralph F. Bowers, New York, on "Operative Treatment of Carcinoma of the Sigmoid Involving the Urinary Bladder."

State Medical Election.—Dr. Robert J. Wilkinson, Huntington, was chosen president-elect of the West Virginia State Medical Association at its annual meeting in Huntington in July and Dr. Richard O. Rogers, Bluefield, was installed as president. Vice presidents are Drs. William T. Gocke, Clarksburg, and John C. Lawson, Williamson. Mr. Charles Lively, Charleston, is the executive secretary. The 1943 session will be held at White Sulphur Springs.

GENERAL

Meeting Canceled.—The American Psychological Association canceled its fiftieth anniversary meeting, which was scheduled to be held in Boston and Cambridge the first week in September. A business meeting was to be held in New York City on September 3.

Obstetricians Suspend Meeting.—The Central Association of Obstetricians and Gynecologists voted to suspend its meetings for the duration of the war and has canceled its meeting scheduled for Des Moines, Iowa, October 22-24. The officers of the association will remain as at present until the next meeting. On resumption of meetings the first one will be scheduled for Des Moines and the next one for Louisville, Ky. Drs. John H. Moore, Grand Forks, N. D., is president; Earl C. Sage, Omaha, president-elect, and William F. Mengert, Iowa City, secretary-treasurer.

Biological Photographic Association.—The twelfth annual meeting of the Biological Photographic Association, Inc., will be held at the Park Central Hotel, New York, September 10-12. The program will include a discussion of trivision color photography, latent image stability, photography of small objects, SM flash lamp in clinical photography, botanic and zoologic photography, and photographic equipment in the army and navy. Lieut. Ralph Creer, in charge of the medical illustration section of the army medical corps, will discuss the use of medical illustration in wartime and Ensign Warren Sturgis, naval medical films.

Roentgen Ray Society Meeting.—The American Roentgen Ray Society will hold its annual meeting at the Palmer House in Chicago, September 15-18, under the presidency of Dr. William M. Doughty, Cincinnati. Included among those who will participate are:

Dr. Paul C. Swenson, New York, Roentgen Diagnosis and Therapy of Ewing's Tumors.
Dr. Charles A. Behney, Philadelphia, Further Evaluation of 200 Kilovolt Roentgen Rays in the Therapy of Carcinoma of the Cervix Uteri.
Dr. Laurence L. Robbins, Boston, Spray Irradiation of Polycythemia Vera.
Dr. W. Walter Wasson, Denver, Intrapulmonary Air Pressure and Its Relation to Pulmonary Capillary Flow.
Dr. Lewis Gregory Cole, New York, Pneumonoultramicroscopic Silicovolcanoconiosis: Highlights and Lowlights in the Story of Dusty Lungs.
Dr. Elmer J. Bertin, Philadelphia, Metastasis to Bone as the First Symptom of Gastrointestinal Carcinoma—Report of Three Cases.
Dr. Robert B. Taft, Charleston, S. C., Ionization Oscillograms.
Dr. Eugene P. Pendergrass, Philadelphia, Some Considerations Concerning the Reports of Deaths and Shocks After the Intravenous Use of Dye in Urography.
Dr. Arthur U. Desjardins, Rochester, Minn., A Group of Persons Whose Skin and Subcutaneous Tissues Are Usually Sensitive to Roentgen Rays.

Obstetricians, Gynecologists and Abdominal Surgeons.—The fifty-fifth annual meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons will be held at the Homestead, Hot Springs, Va., September 10-12, under the presidency of Dr. Grandison D. Royston, St. Louis. Among the speakers will be:

Dr. Carl H. Davis, Wilmington, Del., Hypothyroidism as a Problem in Women—Second Report.
Dr. Louis H. Douglass, Baltimore, Medical Complications of Pregnancy and Labor.
Dr. Edward A. Schumann, Philadelphia, Comments on Certain Phases of Surgical Technic.
Dr. Tiffany J. Williams, Charlottesville, Va., Hydatidiform Mole and Associated Tumors of the Chorion.
Dr. Harold L. Gainey, Kansas City, Mo., Postpartum Observation of Pelvic Tissue Damage.
Dr. Clyde L. Randall, Buffalo, Sarcoma of the Uterus.

The Foundation Prize Thesis will be given Thursday evening by Dr. Harold C. Mack, Detroit, on "The Glycogen Index in the Menopause: A Study of Certain Estrogen Functions, Based on a New Method of Staining Vaginal Smears."

President's Birthday Fund for Infantile Paralysis.—A total of $3,908,310 was collected during the national celebration of the President's birthday last January. The expenses of the committee were $207,889.71, or 5 per cent of the total net amount raised. New York led the states with contributions of $663,646.19. California was second with $337,318.79 and Pennsylvania third with $329,684.39. Illinois was fourth with a total of $202,352.04 and Ohio fifth with a total of $202,236.65. Theaters raised a total of $1,338,059.89. One half of the proceeds collected in the annual President's birthday celebration goes to the National Foundation for Infantile Paralysis, whose share is used to sponsor clinical and laboratory research on the disease, provide epidemic aid and conduct an educational program for both the general public and the medical profession. The other 50 per cent of the funds remains with the state and county chapters of the foundation, where it

is used to provide direct medical assistance to infantile paralysis patients regardless of age. In the four years since the establishment of the chapter plan a total of $4,750,924.35 has been left in the localities throughout the United States and its possessions.

Conference on Tuberculosis.—The Mississippi Valley Conference on Tuberculosis and the Mississippi Valley Trudeau Society will hold their annual sessions at the Edgewater Beach Hotel, Chicago, September 16-18. On Wednesday afternoon a special session will be devoted to exploring channels for tuberculosis education that contribute to child health, at which a group of experts will answer questions. A joint session with the Trudeau Society on Thursday will be addressed by:

Dr. Julius B. Novak, Chicago, Tuberculosis Case Finding in Industry by a Tuberculosis Association.
Dr. Oscar A. Sander, Milwaukee, Surveying Industrial Personnel.
William A. Doppler, Ph.D., New York, Problems Encountered in Organizing Case Finding in Industry and Some Possible Solutions.
Drs. Oscar Lotz, Milwaukee, and Loren L. Collins, Ottawa, Ill., The Tuberculin Test and Tuberculosis Control.
Dr. J. Arthur Myers, Minneapolis, County Accreditation for Tuberculosis Control.
Dr. Herman E. Hilleboe, Washington, D. C., Tuberculosis Control and National Defense.
Dr. Herbert L. Mantz, Kansas City, Mo., Incidence of Tuberculosis Among Civil Defense Personnel.
Dr. James H. Stygall, Indianapolis, Reinfection Tuberculosis in Younger Children.

One feature of a joint session will be a discussion of the "Results of an Adequate Follow-Up of Selective Service Rejectees." At the Trudeau Society meeting on Friday the speakers will include Drs. Morris C. Thomas, major, U. S. Army, Fort Knox, Ky., on "Types of Lung Pathology Encountered in an Army Camp"; Paul D. Crimm, Evansville, Ind., "Results of Pectin-Agar Feeding in Gastrointestinal Tuberculosis"; John D. Steele Jr., Milwaukee, "Bronchospirometry," and William R. Lovelace II and Horton C. Hinshaw, Rochester, Minn., "Effect of Reduced Barometric Pressure on Pneumothorax."

Extension of Latin American Health Program.—The assignment of three physicians to Latin America is another step in the health program recommended at the conference of American foreign ministers held early this year in Rio de Janeiro. Dr. Leonard S. Rosenfeld, New York, was assigned to Nicaragua; Dr. Eugene P. Campbell, whose headquarters will be at San Jose but who will carry on a roving assignment throughout Central America, and Dr. Albert R. Dreisbach, lieutenant colonel, U. S. Army, Washington, D. C., who has been assigned as assistant to Dr. George C. Dunham, lieutenant colonel, U. S. Army, director of the entire health and sanitation program now being carried out in Latin America. The project originated from a recommendation made at the inter-American conference and is designed to support American hemisphere economic mobilization and become the foundation for long range health and sanitation improvements in the cooperating countries. The first step was the appointment of Dr. Dunham early in the spring of this year, and one of his first activities was the institution of a program for malaria control in Ecuador. Dr. Walter C. Earle is in charge of this project. Recently Dr. Dunham conferred with Brazilian authorities to work out some health plan incident to the problems of gathering wild rubber on stretches of the Amazon River and its tributaries beyond reach of ordinary health facilities. The most recent step in the project, announced July 28, was the assignment of a health and sanitation mission to Bolivia under the direction of Dr. Eugene H. Payne, accompanied by Dr. Wendell S. Dove, acting director of the health and sanitation division of the Office of Inter-American Affairs. The Bolivia mission is the eleventh health and sanitation party organized to collaborate with the other Americas under the original program.

Report on Accidents.—According to the annual yearbook of the National Safety Council, entitled "Accident Facts," 102,500 persons were killed in accidents in 1941. Motor vehicles accounted for 40,000 deaths and accidents in the home for 31,500. Motor accidents were responsible for injuring 1,450,000 persons and accidents in the home for 4,650,000. Other public accidents of all kinds were responsible for the deaths of an additional 15,000 persons and the injuries of 1,800,000. The National Safety Council points out that 97 per cent of the total accidents were preventable and cost the nation $4,000,000,000. On the job accidents killed 18,000 workers, injured 1,600,000, cost $850,000,000 and resulted in the loss of 460,000,000 man-days of work during 1941. Every type of motor vehicle accident except collisions with street cars showed a higher fatality total in 1941 than 1940. The bulk of the total increase came in collisions between motor vehicles, which were up 24 per cent; collisions with bicycles, up 20 per cent; collisions with fixed objects, up 23 per cent, and non-collision accidents, up 21 per cent. Deaths from motor vehicle-train collisions at grade crossings numbered 1,834 in 1941. This was even fewer than occurred in 1923, when motor vehicle travel was only a fraction of its present volume and when far fewer trains were operating than in the preparation for defense period of 1941. The release pointed out that of thirty-one industries studied the aeronautics industry was among the top five for 1941 in terms of both accident frequency and severity. Workers in the aeronautics industry suffered only 7.40 disabling injuries per million man-hours as compared with an average of 15.39 for all thirty-one industries. Of the 40,000 persons who were killed in automobile accidents 8,000, or one in five, had been drinking. State summaries for 1941 showed that 11 per cent of the drivers involved in fatal accidents had been drinking and that 14 per cent of the pedestrians killed had been drinking, 1,900 of the 13,600 pedestrian deaths. Summaries for the twenty-two states showed 27 per cent more drinking drivers than were involved in fatal accidents for 1940.

LATIN AMERICA

Defense Health Conference.—The eleventh Pan American Sanitary Conference will be held in Rio de Janeiro, September 7-18. The subjects to be discussed at this conference will be continental defense and public health, tuberculosis and pneumoconiosis, influenza, brucellosis (undulant fever), typhus fever, American parasitoses (especially Chagas' disease and pinto), diarrheas (including Salmonella infections) and degenerative diseases (especially cardiovascular diseases and cancer). Reports will also be presented by the Pan American committees on nutrition, malaria and model sanitary code.

CORRECTIONS

Misplaced Headings in Educational Number.—In THE JOURNAL, August 15, the Educational Number, on page 1333, the column headings under "Orthopedic Surgery—(Continued)" should have been under "Pathology" instead.

On page 1335 the column headings under "Pathology—(Continued)" should have appeared under "Pediatrics" instead.

Memorial Fund to Dr. Martha Tracy.—The American Medical Women's Association writes that erroneous information appeared in the news item in THE JOURNAL, August 22, page 1436, concerning the memorial fund to Dr. Martha Tracy. According to Dr. Helena T. Ratterman, president, the association voted at its meeting in Atlantic City to pay tribute to the memory of Martha Tracy by establishing a fund to be used at the Woman's Medical College of Pennsylvania, Philadelphia. Dr. Lucille Snow, Evanston, Ill., is chairman of a committee in charge of the fund. *Women in Medicine* is the official journal of the American Medical Women's Association and not the *Medical Woman's Journal*, as reported in THE JOURNAL news item.

Government Services

Dr. Hauser Named Assistant of Census Bureau

Philip M. Hauser, Ph.D., Washington, D. C., formerly assistant chief statistician for population, has been appointed assistant director of the Census Bureau and will have under his supervision the divisions of vital statistics, population and housing, agriculture and state and local government.

CCC Camps to Become Hospitals for Girls with Venereal Disease

More than twenty-five camps formerly used by the Civilian Conservation Corps, which has been abolished by Congress, will be used as detention centers and quarantine hospitals to cure and rehabilitate girls infected with venereal diseases, it was announced August 27. The CCC hospitals will be operated by health departments of the various states under standards of medical care recommended by the U. S. Public Health Service. Camps have already been made available in Alabama, Florida, Georgia, Louisiana, Mississippi, New Mexico, Oklahoma, South Carolina, Tennessee, Texas and Virginia. Each hospital is expected to provide medical treatment for 100 to 300 infected girls, who will be kept under care until they are rendered noninfectious and completely cured. Federal assistance will be given to place these girls in legitimate industry when they leave the hospitals.

Foreign Letters

LONDON

(From Our Regular Correspondent)

July 25, 1942.

Sluicing of Streams as an Emergency Antimalarial Measure

Sir Malcolm Watson, director of the Ross Institute of Tropical Medicine, has described in a booklet, issued by the institute, some antimalarial measures in use in Malaya. The loss of the Dutch oil fields to the Japanese has interrupted the supply of oil which killed larvae in running water and saved thousands of lives. The construction of the Panama Canal and the extension of the rubber industry in Malaya depended on the use of oil. Attention has now to be turned to the alternative of sluicing for the destruction of larvae. If this should prove effective for only a few months in the malarial season it would help in winning the war. The use of sluicing dates back to the work of Prof. K. B. Wilkinson in 1930-1932 at Cameron Highlands, Malaya, in destroying Anopheles maculatus under difficult conditions. He showed that simple forms of tippers and sluices destroyed larvae in all the local streams and drains and that after a time the adult anopheles disappeared. In 1937 Sir Malcolm Watson visited Penang and found that nearly two hundred streams were being flushed along 15 miles of the hill which rises out of the center of the island. Some of the sluices were automatic, others hand operated. Formerly so malarial as to be only sparsely inhabited, this area had been practically freed from malaria and land values had gone up. From Penang flushing spread through the Malay Peninsula not only in mountain streams but in almost flat land drains. The method has also been adopted in India. Mr. J. S. De Villiers, chief sanitary inspector of Penang, has devised the simplest form of automatic siphon for antimalarial sluicing. It consists of a disused oil drum which stands inverted on three concrete blocks above the dam, a main siphon which runs under the dam and a secondary siphon made of ¾ inch galvanized iron pipes. When the water rises behind the dam it rises also in the drum, because air passes out through the secondary siphon. Also water flows through the secondary siphon and sucks more air out of the drum. When the water in the drum rises high enough it splashes over the main siphon, which in less than a minute discharges a torrent that flushes the stream.

Rehabilitation After Injuries of the Central Nervous System

Rehabilitation after injuries of the central nervous system has received insufficient attention. Cases are seldom seen by a neurologist until many months have elapsed, when a neurosis may have been established. The great number of war injuries has increased the importance of the subject. In an address to the Neurological Section of the Royal Society of Medicine on rehabilitation after injuries to the central nervous system Prof. Geoffrey Jefferson referred to our increasing knowledge of the mechanism of headache and abandonment of belief in the relation between pressure and headache as against local distortions of dural septums and traction on, or pulsation of, vessels. After head injuries rehabilitation should begin in the convalescent stage of treatment in the hospital and be planned to give not only physical but mental employment day by day. It gives the patient the opportunity to discover that his wage earning capacity is not lost and allow him to turn to another occupation more fitted for his powers. Hitherto rehabilitation had been applied only sporadically and not systematically. It should begin a graded way as soon as the patient's condition allows. The methods included (1) diversional and constructive occupations of sufficient variety for those still confined to bed as well as for those who are ambulant, (2) hospital maintenance work in the ward and outside, (3) physical therapy, remedial exercises, massage and physical training and (4) intellectual and recreational pursuits.

Rehabilitation may be divided into two stages. The first covers the period in the hospital, the patient being confined to bed or ambulatory. Rehabilitation in a diversional form should be instituted early while the patient is confined to bed. It takes the form of reading or being read to, jigsaw, crossword and other puzzles, drawing or coloring, needlework, string bead and basket making, sewing, knitting and rug making. In most cases of dysphasia the retraining of speech by a speech therapist should be started when convalescence is well established, about the third or fourth week. Physical therapy (massage, electricity and gymnastics) will be required but should not dominate the rehabilitation scheme. Mental occupation and encouragement to do things are more important. This stage will last about six weeks. The second stage is a period of hardening, once symptoms have abated. Military cases should be taken over by the respective services, since this means canalization toward special work. For civilian cases the treatment consists in gymnastics and physical training, continuation of some of the occupations mentioned, work in the garden, or carpenter's or engineer's shop, organized games, visits to the town, shops and the cinema. But no patient with a head injury should go on a bus or train journey until he has proved his ability to do this.

RIO DE JANEIRO

(From Our Regular Correspondent)

June 30, 1942.

Brazilian Typhus Fever Virus

Prof. Octavio Magalhaes and Dr. Adir Rocha, from the University of Belo Horizonte, state of Minas Gerais, have published a paper describing a careful analysis of 228 samples of Brazilian typhus fever virus. They reached the conclusion that there are at least three main strains of typhus virus into which it is possible to classify all the different samples up to now isolated from man or animals as patients, with severe or light disease or as simple carriers of the virus. They have called these strains VB, VA_1 and VA_2. The strain VB is the virus of the typical Brazilian typhus, showing very constant characters. The other two are attenuated strains. The classification has been done by taking into consideration twelve classes of research: (1) incubation time in the experimental disease, (2) duration of the experimental disease, (3) reactions of the susceptible animals (thermic, testicular, vulvar, splenomegalic, peritoneal and gangliar), (4) percentage of death in the experimental disease, (5) susceptible animal (guinea pig, rabbit and rhesus monkey), (6) cross immunization, (7) precipitin tests, (8) resistance to freezing and to glycerin, (9) Weil-Felix reactions in the natural and the experimental disease, (10) pathologic findings (microscopic and macroscopic), (11) presence of Rickettsiae and (12) pathogenicity to man.

Myxomatosis Transmitted by Mosquitoes

Dr. Henrique Aragao of the Oswaldo Cruz Institute read before the Brazilian Society of Biology a note on the transmission of the virus of myxomatosis (Chlamydozoon myxomae) by mosquitoes of the species Aedes aegypti and Aedes scapularis. The Brazilian wild rabbit (Sylvilagus minensis) is susceptible to the virus of myxomatosis, but in this animal the disease takes a milder character, lasts a long time and in general does not kill the rabbit. As a rule the tumors are smaller and less numerous than those of the domestic rabbit, but large and

flat lesions have been noted. A few of these animals caught in the forests were sick with the disease, but many of them are found to be immune. The experimental infection of the wild rabbit may be easily obtained by cutaneous, subcutaneous and conjunctival inoculations and also by placing a healthy wild rabbit in the same cage with a sick domestic animal. It is also possible to obtain the infection of the wild and domestic rabbits by the bite of infected blood sucking insects, as fleas and mosquitoes. The infected mosquito can transmit the disease several times in succession up to at least seventeen days after it has fed on a sick rabbit, as has been observed by Aragao. The transmission is purely mechanical, and only the proboscis of the insect contains the virus, as has been shown by the inoculation of emulsions of the proboscis, the thorax and the abdomen of the mosquito. Though mechanical, this kind of transmission has epidemiologic significance, as this means of dissemination easily explains the sudden outbreaks of myxomatosis in animals breeding in places where there have been no rabbits for a long time. It was Aragao who at first pointed out the transmission of myxomatosis by fleas (Stenopsylla). Some time later Torres, also of the Oswaldo Cruz Institute, showed that the mosquito Culex quinquefasciatus is capable of transmitting the disease. Now again Aragao has demonstrated that Aedes aegypti and Aedes scapularis mosquitoes are able to transmit myxomatosis. The virus is seen in smears of material from the tumors of wild rabbits with the same morphology as in material from domestic animals.

TEL AVIV, PALESTINE

(From Our Regular Correspondent)

July 17, 1942.

Blood Banks in Palestine

Many years before the outbreak of war, this country was faced with the problem of how to supply the necessary quantities of blood required for transfusions. When the disturbances first began in Palestine in 1936, that is, before we had the opportunity to benefit from the experience of the civil war in Spain, we were forced to seek a solution to the question of blood transfusions and to discover a means for conserving and storing blood at a time when these problems were receiving little or no attention in European countries or in the United States. Quite apart from the general difficulties involved in the conservation of blood, we were confronted with specific medical and organizational problems due to the special conditions of this country.

After several preliminary tests, the first store for conserved blood in Palestine, and perhaps in the Middle East, was set up in the Beilinson Hospital (of the Kupat Holim) in 1938. The first source of blood was the blood obtained from the placenta in maternity cases. From this store blood was supplied for all the requirements of the Beilinson Hospital, which at that time were greater than usual owing to the excessive casualties in the vicinity resulting from the disturbances. Soon the conserved blood of adults began to be used, while placenta blood was used for other therapeutic purposes (endocrine treatment for amenorrhea and sterility). At the end of 1939 the use of plasma of the placenta was commenced, and shortly afterward the plasma of other blood, with entirely satisfactory results. Up to the present six hundred transfusions of conserved blood and four hundred plasma transfusions have been administered without a single unfavorable reaction such as hemoglobinuria or anuria. The percentage of reactions, including chills, was, generally speaking, about 8 per cent for blood transfusions and much less for plasma transfusions.

The problem of malaria is acute. While there is great variation in the incidence of this disease as between one district and another and particularly as between rural and urban districts, the total number of malaria cases, in the past and in the present, is high. Before the use of conserved blood for transfusions was begun, much difficulty was often experienced in obtaining supplies of blood from persons who had never had malaria, especially in such malarial districts as Emek Jezreel and Galilee. With the introduction of conserved blood for transfusions, this problem has been solved. It seems probable that the maintenance of the conserved blood at a low temperature destroys all the malarial plasmodia, and there is no longer any hesitation in accepting blood from donors who had suffered from malaria in the past. No adverse effects from the use of such blood have so far resulted.

Today nearly all public hospitals in the country have their own blood banks, the blood being taken in most cases from the members of the families of the patients. In addition supplies are available from organizations of volunteer blood donors, from whom large quantities of blood may be taken if the banks should become exhausted.

Rothschild-Hadassah-University Hospital, Jerusalem

Following the outbreak of the war and the deterioration of the economic situation in Palestine, the activities of the Rothschild-Hadassah-University Hospital were greatly extended. The number of beds in the hospital was increased from 215 in May 1939 to 325 in May 1942 and, in addition, 200 reserve beds are kept in readiness for emergency cases.

A neurosurgical department was opened in the Rothschild-Hadassah-University Hospital at the beginning of 1942. This department is headed by Dr. Henry Wigderson, a neurosurgeon from the United States who worked previously as assistant to Dr. Sachs of St. Louis and later as neurosurgeon in several New York hospitals. The need for a neurosurgical department in the Near East was acutely felt after the outbreak of the war. Before the war, neurosurgical cases had usually been directed to European capitals. The opening of this department in the Medical Center is another step toward the extension of its scientific work and the complementing of therapeutic facilities in the surgical field in the Near East. Since the department was opened it has treated a considerable number of patients, both local and from neighboring countries.

In 1940 occupational therapy was introduced in the Rothschild-Hadassah-University Hospital, which is the only general hospital in Palestine engaged in this activity. Occupational therapy is given especially in skin and radium cases as well as in the pediatric and other departments.

In connection with the war situation, research work on the treatment of complicated wounds has been undertaken by the surgical divisions in conjunction with the department of pathologic anatomy of the Hebrew University.

An underground air raid shelter has been constructed in the hospital grounds which can accommodate a large number of patients and personnel. Fortunately there has been no need to make use of it so far, except for alarm practice.

Congress of Nerve Specialists in Tel Aviv

After an interval of several years, during which scores of physicians from various European countries have found their way to Palestine and begun to practice in this country, the second Congress of Nerve Specialists took place in Tel Aviv on April 17. About seventy-five nerve specialists from Jerusalem, Haifa, Tel Aviv and other parts of Palestine, as well as many other physicians, took part. A number of British and Australian physicians now serving with the forces were also present as guests. One of the principal subjects discussed was "Methods of Psychiatric Treatment Through Shock of Cases of Schizophrenia." The second subject was the "Present Situation in Surgery of the Brain," on which Dr. Vigdorson delivered a comprehensive address. Other subjects of discussion included various neurologic and psychiatric problems.

Deaths

Hugo Ehrenfest ✠ St. Louis; Medizinische Fakultät der Universität Wien, Austria, 1894; assistant professor and professor of gynecology and obstetrics at St. Louis University School of Medicine from 1904 to 1920; associate professor of obstetrics at the Washington University School of Medicine from 1922 to 1926, professor of clinical obstetrics and gynecology from 1926 to 1936 and since then professor emeritus; specialist certified by the American Board of Obstetrics and Gynecology, Inc.; member of the American Gynecological Society and the Central Association of Obstetricians and Gynecologists; fellow of the American College of Surgeons; gynecologist to the Jewish Hospital; associate obstetrician to St. Louis Maternity Hospital; editor, *American Journal of Obstetrics and Gynecology;* aged 72; died, July 24, of coronary thrombosis.

Clinton G. Hickey, Denver; Albany (N. Y.) Medical College, 1884; member of the Colorado State Medical Society; member of the faculty of the University of Colorado School of Medicine during 1896-1897 and later instructor of physical diagnosis at the Denver and Gross Medical College; from 1915 to 1921 member of the Colorado State Board of Health, and its president, 1919-1920; past president of the Denver Clinical and Pathological Society; treasurer from 1921 to 1923 of the Medical Society of the City and County of Denver and president in 1925; aged 83; died, May 20, in St. Luke's Hospital of arteriosclerosis.

Nelson Shelly Weinberger ✠ Sayre, Pa.; Medico-Chirurgical College of Philadelphia, 1905; member of the American Academy of Ophthalmology and Otolaryngology and the Association for Research in Ophthalmology, Inc.; member and formerly vice president of the American Laryngological, Rhinological and Otological Society; fellow of the American College of Surgeons; specialist certified by the American Board of Otolaryngology; ophthalmologist and otologist to the Robert Packer Hospital; aged 60; died, June 28, of glioma.

Augustus Joseph Hambrook ✠ Troy, N. Y.; Albany Medical College, 1907; past president and secretary of the Medical Society of the County of Rensselaer; served as a captain in the medical corps of the U. S. Army during World War I; in 1937 was appointed a member of the state advisory council on health and physical education in public schools; medical consultant in the city department of public welfare; on the staff of the Troy Hospital; aged 59; died, July 13, in the Homer Folks Tuberculosis Hospital, Oneonta.

Thomas Albert Bryan ✠ Mattoon, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; fellow of the American College of Surgeons; medical examiner for the local draft board; served as a captain in the medical corps of the U. S. Army during World War I; on the staffs of the Methodist Memorial Hospital and the Independent Order of Odd Fellows Old Folks Home Hospital; aged 63; died, June 16, of coronary occlusion.

Aaron Locke Higgins ✠ Rockville Centre, N. Y.; Tufts College Medical School, Boston, 1907; past president of the Nassau County Medical Society; fellow of the American College of Surgeons; for many years chief surgeon and president of the board of the Mercy Hospital; on the staff of the South Nassau Communities Hospital; consulting obstetrician to the Meadowbrook Hospital, Hempstead; attending obstetrician to the Nassau Hospital, Mineola; aged 58; died, July 17.

Ernest Leonard Schroeder ✠ Shawano, Wis.; Northwestern University Medical School, Chicago, 1914; president of the Shawano County Medical Society; formerly mayor of Shawano; served as a major in the medical corps of the U. S. Army during World War I; on the staff of the Municipal Hospital; formerly member of the board of visitors of the University of Wisconsin, Madison; chairman of the Shawano County Council of Defense; aged 56; died, July 7.

Thomas Chalmers Clark ✠ Arlington, Va.; Rush Medical College, Chicago, 1881; an Affiliate Fellow of the American Medical Association; member of the Minnesota State Medical Association; for many years member of the Minnesota National Guard; veteran of the Spanish-American War; formerly on the staff of the Minnesota Soldiers' Home, Minneapolis; aged 89; died, June 19, in Washington, D. C., of cerebral hemorrhage and arteriosclerosis.

William Everett Gray, Milltown, N. B., Canada; McGill University Faculty of Medicine, Montreal, Que., 1907; member of the New England Obstetrical and Gynecological Society; past president of the New Brunswick Medical Society; on the staff of the Chipman Memorial Hospital, St. Stephen, where he organized and served as pathologist in the Prescott Memorial Laboratories; aged 56; died, May 22.

Henry William George ✠ Middletown, Pa.; Jefferson Medical College of Philadelphia, 1901; member of the American Academy of Ophthalmology and Otolaryngology and the Association for Research in Ophthalmology, Inc.; specialist certified by the American Board of Ophthalmology; for many years president of the local school board; aged 64; died, July 7, in the Jefferson Hospital, Philadelphia.

Evan Griffith Galbraith ✠ Toledo, Ohio; University of Michigan Medical School, Ann Arbor, 1916; specialist certified by the American Board of Otolaryngology; member of the American Broncho-Esophagological Association; served during World War I; aged 54; was killed, June 14, when the automobile in which he was driving was struck by a train near Devils Lake, Mich.

George Walter Brasher ✠ Jackson, Tenn.; University of Tennessee Medical Department, Nashville, 1909; past president of the Madison County Medical Society and the West Tennessee Medical Association; councilor of the Eighth District Medical Society; aged 70; died, June 25, in the Fitts-White Clinic of coronary thrombosis.

Harold Flavell Westcott, Clayton, N. Y.; Jefferson Medical College of Philadelphia, 1916; member of the Medical Society of the State of New York; served in the medical corps of the U. S. Army during World War I; health officer and school physician of Clayton; aged 47; died, June 25, in Blackwood, N. J., of coronary thrombosis.

David Feiner ✠ Brooklyn; University and Bellevue Hospital Medical College, New York, 1912; specialist certified by the American Board of Obstetrics and Gynecology, Inc.; on the staffs of the Adelphi and Israel-Zion hospitals; aged 52; was killed, June 15, when he fell from a sixth floor roof.

Dwight Cortland Phillips ✠ Chicago; College of Physicians and Surgeons of Chicago, 1895; served as a captain with the American Expeditionary Forces in France during World War I; for many years on the staff of St. Mary of Nazareth Hospital; aged 69; died, June 15, of heart disease.

George Warren Newell, Burlington, Wis.; Northwestern University Medical School, Chicago, 1905; city health officer; served as a major in the medical corps of the U. S. Army in France during World War I; aged 64; died, June 29, in Rochester, Minn., of carcinoma of the prostate.

William Taylor Lindsay, Moscow, Ohio; Starling Medical College, Columbus, 1893; for many years Hamilton County jail physician; at one time district physician for the board of health of Cincinnati; aged 74; died, June 14, of carcinoma of the pancreas with metastasis to the liver.

John Joseph Mahoney, Los Angeles; Beaumont Hospital Medical College, St. Louis, 1901; St. Louis University School of Medicine, 1905; for many years a member of the city health department; aged 71; died, June 4, in St. Vincent's Hospital of heart disease and arteriosclerosis.

Clyde Vincent Nelson Jr., Van Nuys, Calif.; University of Southern California School of Medicine, Los Angeles, 1935; member of the California Medical Association; aged 31; was killed, June 19, when he fell down the icy slope of the Grand Teton Mountain in Wyoming.

Henry Percival Hargrave, Medford, Ore.; Manitoba Medical College, Winnipeg, Man., Canada, 1895; formerly health officer of Jackson County and member of the city council of Medford; aged 67; died, June 28, of cerebral hemorrhage and carcinoma of the bladder.

Ferdinand Rosenberger ✠ New York; Ludwig-Maximilians-Universität Medizinische Fakultät, Munich, Bavaria, Germany, 1917; aged 50; on the staffs of the Hospital for Joint Diseases and the Mount Sinai Hospital, where he died, June 2, of coronary thrombosis.

Alvis A. Williamson, Michigantown, Ind.; Medical College of Indiana, Indianapolis, 1898; member of the Indiana State Medical Association; president of the Clinton County Medical Society; aged 68; died, June 28, of diabetes mellitus.

Albert H. Wales, Santa Monica, Calif.; Chicago Homeopathic Medical College, 1888; Harvey Medical College, Chicago, 1896; served during World War I; aged 75; died, May 19, of cerebral thrombosis and prostatic hypertrophy.

Fred Carl Weber ✠ Newport, Ky.; Pulte Medical College, Cincinnati, 1904; member of the board of education; served in France during World War I; formerly mayor of Newport; aged 64; died, July 11, of cerebral hemorrhage.

Bureau of Investigation

STIPULATIONS

Agreements Between Federal Trade Commission and Promoters of Various Products

The following items are abstracts of stipulations in which promoters of "patent medicines," or medical devices have agreed with the Federal Trade Commission to discontinue certain misrepresentations in their advertising. These stipulations differ from the "Cease and Desist Orders" of the Commission in that such orders definitely direct the discontinuance of misrepresentations. The abstracts that follow are presented primarily to illustrate the effects of the provisions of the Wheeler-Lea Amendment to the Federal Trade Commission Act on the promotion of such products.

Bullock's Products.—Henry Spangler, using the trade styles National Laboratories and National Laboratories, Inc., Benjamin Franklin Station, Washington, D. C., stipulated with the Federal Trade Commission in October 1941 that he would discontinue the following misrepresentations in his advertising: that "Bullock's System" or the preparations designated as "Bullock's Antiseptic Healing and Cleansing Tonic," "Bullock's Nasal Salve," "Bullock's Antiseptic Emollient" and "Bullock's Clear Head Tablets" or any other preparation of substantially the same composition as the foregoing constitutes a competent remedy for sinusitis, infectious catarrh or any other disorder of the nose, mouth, throat or sinus. He further agreed that he would either discontinue any advertisements which failed to reveal that the frequent or continued use of Bullock's Clear Head Tablets or any similar preparation may be dangerous, causing collapse or dependence on the drug, or include in his advertisements the warning that his product should be used only as directed on the label and that the label itself would warn the user that the frequent or continued taking of the product might be dangerous, causing collapse or dependence on the drug.

Calafo Liquid.—In December 1941 the Calafo Company, Inc., Los Angeles, signed a stipulation with the Federal Trade Commission regarding Calafo Liquid. In this it agreed to cease representing the product as being capable of checking the tendency toward attacks of asthma and hay fever and to discontinue any advertisements which failed to reveal that the nostrum should not be used by persons suffering from lung disease, chronic cough, goiter or thyroid disease except on advice from a physician. There also was to be given the warning that its use should be discontinued if a skin rash appeared and also that its use over an extended period should be avoided except on competent medical advice, in addition to the warning that it should not be given to children. The stipulation, however, provided that, if the label carried sufficient warning as to the foregoing, the advertisements need contain only the statement "Caution, use only as directed." Calafo Liquid was reported by government chemists to be essentially a mixture of potassium iodide, opium, alcohol and water back in 1934, when it was declared in a federal court to bear false and fraudulent claims on its label.

George Cary Earnist "Health Booklets."—From New York Bernard Munves, Paul Pukula and Benjamin Pukula, operating under the name George Cary Earnist sold booklets designated "The Daily Five" and "The Hundred Dollar System of Scientific Physical Efficiency." These contained instructions for certain physical exercises as well as a "Daily Diet" and other alleged health rules and suggestions. In October 1941 these three persons signed a stipulation with the Federal Trade Commission in which they agreed to discontinue misrepresentations in the advertising of their booklets. Among these were that the exercises outlined in these booklets will have any demonstrable effect on, or are a competent remedy for indigestion, torpid liver, nervous trouble, impure blood or weak heart or lungs; that such exercises can be depended on to remove constipation or its cause, to correct ill health, preserve health or strength or revitalize the system; or that, by following exercise instructions as outlined, internal organs not under voluntary control will be exercised. According to the stipulation, the respondents also will cease representing that the "Daily Diet" as set forth in the booklets contains complete dietary information and hygienic rules, or that such "Diet" is in accordance with the modern science of dietetics; that the "Shockless Cold Bath" described in the booklets is or acts as a nerve "tonic" or has any beneficial effect on the brain or nerve center; and representing or quoting as the customary or regular price or value of the booklets prices or values which are, in fact, fictitious and in excess of the prices at which the booklets customarily are offered for sale and sold in the normal course of business. According to the Bureau of Investigation's files, George Cary Earnist was the originator of The Daily Five. The *West Virginia Medical Journal* for January 1938 called attention to the fact that in promoting his "course" Earnist had used a photostat of a testimonial written on the stationery of the West Virginia State Medical Association by one of their councilors. This man had served the Association in 1911 and had long since died. Above the letter Earnist had played up the claim "Medical Association Recommends The Daily Five," which, because of the individual signature and the date of the letter, was obviously misleading.

Hayrin Nasal Filters.—This is put out by Medical Products Institute, Inc., Cincinnati. In July 1941 that concern stipulated with the Federal Trade Commission that it would cease representing that its device will prevent or cure or constitute a treatment for hay fever, rose fever or seasonal asthma; that this mechanism, when used in combination with a filter pad impregnated with "Hayrin Nasal Filter Pad Fluid" will overcome the symptoms due to pollens and molds which might enter the body; that its filters purify or completely filter the air breathed or prevent pollens or molds from reaching the sensitive membranes or aid in the treatment or prevention of colds. Further, the concern promised to cease representing itself as an institute devoted to scientific study of ailments and conditions of the body.

H. V. 222.—This is a product of H. V. Laboratories, Inc., St. Louis, which in December 1941 stipulated with the Federal Trade Commission to discontinue the following misrepresentations in the advertising: that this preparation is a remedy or cure for skin eruptions or irritations, including rash or eczema, or has any value in treating them beyond giving relief to the associated itching; that it will cure or prevent athlete's foot, will penetrate or kill such of the fungi of this condition as may develop beneath the corneous layer of the unbroken skin or that in treating this disorder it has any beneficial effect on the tissues deeper than the peripheral vascular system beneath an unbroken skin; that it will remove the blisters manifesting the condition known as athlete's foot or that, diluted or undiluted, it kills the germ infection or fungi of athlete's foot in 30 seconds or in any other definitely stated period of time. The concern further agreed to cease representing that H. V. 222 is a panacea or prevents or stops bleeding or causes coagulation.

Knipe Shoes.—These are put out by Knipe Brothers, Inc., shoe manufacturers of Ward Hill, Mass. In December 1941 that concern signed a stipulation with the Federal Trade Commission in which it agreed to cease using the word "Doctor" or the term "Dr." or any simulation thereof as a trade name for the shoes that it sells, which term might give the impression that the shoes so designated are made in accordance with the design or under the supervision of a physician and contain special scientific or orthopedic features which are the result of medical determination or services.

Luvos Pack and Luvos Minerals.—These were sold by a Paul R. Kemper, trading as Luvos Clay Company of America and as Luvos Minerals Company, Los Angeles. In a stipulation that Kemper signed with the Federal Trade Commission in September 1941 he agreed to discontinue these misrepresentations: that "Luvos Pack" is a remedy or cure for nose, mouth or throat ailments, rheumatic, neuralgic or other disorders, or offers any benefit beyond that of its poultice-like action in temporarily relieving pain; that "Luvos Minerals" will prevent or remedy colitis, gastritis, hyperacidity and numerous other conditions or do more than aid in reducing hyperacidity or be of any value in the treatment of throat irritations or infections. Kemper further agreed to cease representing that either of the products is free from drugs or medication or prescribed by physicians or that Luvos Minerals has any influence on metabolism or will "bind" poisonous material or react on the whole body organism.

Miel de Maguey, Germ of Wheat, Redi-Meal, Kelement and Melvite Food.—These were represented as health foods by Solomon Sherman, trading as Sherman Foods, New York. In November 1941 this person stipulated with the Federal Trade Commission that he would cease representing, among other things, that "Miel de Maguey" is valuable as a preventive of rickets or is superior in nutritive and vitamin value to cod liver oil or is a substitute therefor; that "Germ of Wheat" will build resistance and can be depended on to combat constipation, aid digestion, improve the appetite or cause steady nerves; that "Redi-Meal" constitutes a complete food or that lecithin, one of its ingredients, is an important dietary element; that "Kelement" is a competent treatment for goiter, skin diseases, low vitality, neuritis, overweight, rheumatism and other ailments and that "Melvite Food" is a superior source of energy.

M-K—Mantho-Kreoamo.—This nostrum is put out by Mantho-Kreoamo, Inc., Clinton, Ill. Both in the name of the nostrum and of the company "Mantho" was originally written "Mentho." Although this latter term suggested that the product was based on menthol, only a trace of that substance was found by government chemists who tested a specimen of the preparation back in 1928. They stated that in addition to the menthol the product consisted essentially of ammonium chloride, wood tar, creosote, sugar and water. The government charged that the product "Mentho-Kreoamo" was fraudulently represented as a remedy for bronchial troubles. Just when the name was changed is not apparent, but the records show that in July 1936 Mantho-Kreoamo, Inc., stipulated with the Federal Trade Commission that it would no longer represent that "M-K Cold Remedy" (presumably another title for Mantho-Kreoamo) prevents pneumonia and is effective for coughs, colds, bronchitis or complications of colds, unless such representations are limited to symptomatic relief. In a second stipulation which the concern signed with the Federal Trade Commission in October 1941 it agreed to discontinue the following misrepresentations in the advertising of M-K—Mantho Kreoamo: that the product will combat symptoms of cold infections, prevent colds, soothe inflamed bronchial membranes, allay fever or give relief in cases of influenza or bad colds, in excess of such relief as its expectorant properties might offer. The concern also agreed to cease representing that the person from whose prescription the formula originated or was developed was a noted Illinois physician or had national fame.

Na-Pa Balm.—This is put out by D. R. Sterett and Margaret Sterett, trading under the name Na-Pa Chemical Company, Leavenworth, Kan. In January 1941 the Steretts signed a stipulation with the Federal Trade Commission in which they agreed to discontinue the following misrepresentations in advertising this nostrum: that it is a competent treatment or an effective remedy for colds, will break up colds or provide protection against them or offer more than temporary relief from the symptoms and discomforts associated therewith; that "Na-Pa Balm" is a remedy for, will protect against or aid in the prevention of muscular aches and minor ailments or afford more than temporary relief from such painful conditions; that it penetrates, keeps out cold germs or

serves as a remedy for or preventive of throat infections or sinus irritations. The Steretts further agreed that in making comparisons of the absorbability of goose grease or any other ingredient in their product, they will state the ingredient with which comparison is made and further will not go beyond the facts.

Olbas Herb Oil.—R. Keller of New York, trading as Olbas Company, stipulated with the Federal Trade Commission in August 1941 that he would no longer represent that this product will ease the spasms of coughing, asthma or irritation of the respiratory channels or relieve flatulence or digestive disturbances; that the essential oil from which Olbas is distilled is scarcely known in the Western world and that every detail of Olbas's varied application is supported by clinical evidence from European physicians.

Rhumo-Tabs, Rhumo-Rub, Healo-Salv and At-Letes Foot Liquid Balm.—These are put out by a Harry Florian, trading as Florian Drug Company, Chicago. In a stipulation that he signed with the Federal Trade Commission in December 1941 he agreed to discontinue the following misrepresentations in his advertising: that Rhumo-Tabs is a new discovery in the treatment of rheumatism; that Rhumo-Rub is an effective remedy for colds or superior in effectiveness and rapidity of action to all competitive products; that Healo-Salv heals or aids in the healing of ulcers, boils or similar ailments or in conditions considered incurable; or that At-Letes Foot Liquid Balm is a cure for scabies or barber's itch. Further, he agreed to discontinue use of the word "Healo" to designate or describe the product sold as Healo-Salv or from otherwise representing that it is a cure or remedy.

"Short Stature and Height Increase."—This was the title of a book promoted by one Benjamin H. Levine, trading as Harvest House, New York. According to a stipulation that he signed with the Federal Trade Commission in December 1941, he agreed to cease representing that this volume outlines methods for increasing height by growth or, through use of terms such as "medically approved," that the methods presented in the book for increasing one's appearance of height have been approved by a medical group, association or society.

Slendotabs.—That the use of these tablets is an easy, dependable, sensible or correctly balanced weight-reducing method or will attractively or otherwise effectively slenderize the user's figure, or that physicians would approve of it as a competent and safe means of permanent weight reduction were misrepresentations which Gaylord W. Keeton, Arthur Nebel and Frank Sterling, trading as Keneco Health Products, Elmira, N. Y., agreed to discontinue, in a stipulation that they signed with the Federal Trade Commission in December 1941.

Stop.—This is put out by an H. G. Bernstein, trading as Purity Certified Products, Chicago. In November 1941 Bernstein stipulated with the Federal Trade Commission that he would discontinue certain misrepresentations. Among them were that Stop purifies the breath or kills or neutralizes unpleasant breath odors or that it possesses efficacy as a deodorant, except to the extent that it may partially and temporarily mask unpleasant breath odors. Bernstein further stipulated that he would cease using the name "Stop" or any other designation which implies that the product stops bad breath.

Stop-Lite Products.—These consisted of "Stop-Lites," "Haps" and "Anti-Acid Tablets," all put out by Stop-Lite Products, Inc. of Salt Lake City. In August 1941 this concern stipulated with the Federal Trade Commission to discontinue the following misrepresentations: that Stop-Lites (a tablet) will relieve or cure a cold or will benefit that condition any way beyond inducing laxation and affording temporary relief from the physical discomfort of the symptoms; that it is different from any other product intended for the same purpose or constitutes an effective internal antiseptic or is safe to use, or that the Anti-Acid Tablets aid digestion. The concern further agreed to discontinue any advertisements for Stop-Lites or Haps which failed to reveal that frequent or continued use of either of these may be dangerous, causing serious blood disturbances and that the product should not be administered in excess of the dosage recommended. The stipulation provided, however, that when the labels of these products contained a similar warning, the advertisements need only caution the reader that either preparation should be used only as directed on the label. In October 1941 W. E. Featherstone, trading as W. E. Featherstone Advertising Agency, Salt Lake City, signed a similar stipulation.

Thelorysus.—In a stipulation signed with the Federal Trade Commission in September 1941 Fred E. Thieleman, trading as Thieleman Drug Company, Dearborn, Mich., agreed to cease representing that this product has any value in the treatment of eczema, pimples, itch or other skin disorders or that it is an elixir which will stimulate general systemic resistance to psoriasis or resolve and abate persistent lesions.

Vitamina and Vitaminascope.—The first-named product was said to be an oil extracted from sharks' livers and the second a device for determining vitamin A deficiency. They were put out by a Carlton Deederer, M.D., of Miami, Fla., trading as Dr. Deederer Products. In a stipulation that he signed with the Federal Trade Commission in August 1941 he agreed to cease representing, among other things, that "Vitamina" will in any manner benefit the health of users, except to the extent that it may benefit the health of those who suffer from a vitamin A deficiency; that it will benefit the "average diet" by supplying a vitamin A deficiency; that it is a super-vitamin or in any way superior to the vitamin A obtained from other sources; that it will prevent or dissolve calcium deposits in the system, eliminate or prevent gray hair or baldness or make hair grow. Further, Dr. Deederer stipulated that he would cease representing that the "Vitaminascope" will accurately show the extent to which a vitamin A deficiency exists in any given case, or the extent to which such deficiency is being supplied by administration of any source of vitamin A, or that the device will standardize the amount of vitamin A in the preparation Vitamina.

MISBRANDED PRODUCTS

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE.—These Notices of Judgment are issued under the Food, Drug and Cosmetic Act and in cases in which they refer to drugs and devices they are designated D. D. N. J. and foods, F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product, (2) the name of the manufacturer, shipper or consigner, (3) the date of shipment, (4) the composition, (5) the type of nostrum, (6) the reason for the charge of misbranding and (7) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Parkelp and Parkelp Tablets.—Philip R. Park, Inc., San Pedro, Calif. Aug. 2, 1940. Composition: Parkelp, dried kelp (seaweed); Parkelp Tablets, same material compressed into tablet form. Charge of misbranding was based on false label representations that these products were an effective treatment for hair and scalp troubles, secondary anemia, rickets and other types of bone deficiency and would supply adequate amounts of mineral to the diet, thus relieving many disorders such as colds, anemia, obesity, heart trouble, goiter and eczema.—[*D. D. N. J., F. D. C. 388; March 1942.*]

Pronto.—Alfred S. Hope, Los Angeles. May 8, 1940. Composition: powders, each containing bismuth subcarbonate 9.15 grains, magnesium oxide 4.22 grains, aspirin (free and combined) 3.6 grains, a silicate, such as kaolin, and sugar. Falsely represented as an effective treatment of stomach and bowel ailments, including colitis and ulcers.—[*D. D. N. J., F. D. C. 389; March 1942.*]

Red Fox Quinine Hair Tonic.—Healox Company, Inc., Brooklyn. Nov. 12, 1940. Composition: essentially alcohol, water and small amounts of brucine and perfume. Misbranded because no quinine was present, although so represented in the name; also because the claim "relieves dandruff" was false.—[*D. D. N. J., F. D. C. 362; March 1942.*]

Ru-Mari.—American Ru-Mari Company, Los Angeles. Between Feb. 17 and April 1, 1940. Composition: about 99 per cent water, with minute amounts of potassium carbonate, sodium hydroxide, chloride, sulfate and carbonate, and a trace of an organic compound such as chloramine-T. Misbranded because the word "Ru-Mari" in the firm's name falsely represented that its product was a remedy for rheumatism; further misbranded because of label representations that it possessed effective diuretic action in treating arthritis, neuritis, sciatica, lumbago, gout and allied conditions, would promote elimination of toxin-forming matter through the urinary tract and was a blood conditioner.—[*D. D. N. J., F. D. C. 390; March 1942.*]

St. Bernard Compound Herb Tea.—"Dr." Lyncha A. Johnson, Memphis, Tenn. Between Jan. 4 and Jan. 16, 1940. Composition: essentially plant materials such as sassafras bark, uva ursi, mallow flowers and buchu leaves. Misbranded because label falsely claimed it to be useful for irritation of the kidneys, bladder, gravel, backache and certain rheumatic disorders, besides being a tonic and antispasmodic.—[*D. D. N. J., F. D. C. 369; March 1942.*]

Sun Dried Nova Scotia Dulse.—Gus E. Sjoberg, trading as Coffin Fish Company, Seattle. Between Aug. 23 and Dec. 27, 1939. Composition: a dark brown vegetable material, apparently dried seaweed. Misbranded because falsely represented on cartons and in circulars as efficacious for treating goiter, constipation, scurvy, thyroid disturbances, stomach troubles and some other things.—[*D. D. N. J., F. D. C. 374; March 1942.*]

Wonder Dandruff Cure.—Wonder Dandruff Cure Company, Cedar Rapids, Iowa. Aug. 3, 1940. Composition: an artificially colored, perfumed watery solution containing arsenic, alcohol and glycerin. Misbranded because falsely claimed on the label to eradicate dandruff, restore lifeless hair to a healthy, natural condition, prevent it from coming out and stop irritation and itching of the scalp; further misbranded because label did not bear the common name of each active ingredient, or an accurate statement of the amounts of alcohol and arsenic present.—[*D. D. N. J., F. D. C. 363; March 1942.*]

World Famous New Life Laxative Tonic.—Harry B. Kahng, trading as New Life Medicine Company, Atlanta, Ga. Between Oct. 2 and Dec. 7, 1939. Composition: epsom salt, free sulfur, senna, anise, cascara, licorice and unidentified material. Misbranded because falsely represented to improve health, cleanse the system, act as a tonic and be an effective treatment for a long list of disorders. Defendant found guilty and placed on probation for one year.—[*D. D. N. J., F. D. C. 375; March 1942.*]

World's Tonic Compound with Alkalines.—World's Medicine Company, Columbus, Ohio. July 6, 1940. Composition: essentially plant drugs including sassafras, licorice and laxatives such as aloe and emodin-bearing drugs, together with 12 per cent of alcohol and small amounts of iron, strychnine and alkaline substances. Misbranded because, though essentially a laxative, it was falsely represented as a tonic and a source of alkalis. Further misbranded because nux vomica content was incorrectly declared.—[*D. D. N. J., F. D. C. 361; March 1942.*]

Correspondence

PREVENTION OF RENAL COMPLICATIONS IN USE OF SULFONAMIDES

To the Editor:—Drs. Keitzer and Campbell report in The Journal of June 27 having seen 11 patients with renal symptoms or anuria due to sulfadiazine alone, and as many patients with renal complications due to the other sulfonamides. Since April 1940, when the case of hematuria from sulfathiazole therapy occurred which I reported in The Journal of Aug. 3, 1940, I have treated 67 cases with sulfathiazole and 75 cases with sulfadiazine, without experiencing any such complications. At that time I adopted a simple procedure which is as applicable to treating "a soldier in the jungles of Malaya or the deserts of northern Africa" as here at home. The only equipment required is a transparent container. In this the last urine passed is exhibited at all times in a prominent place near the patient. Every time the patient voids, the old sample is discarded and the new one substituted. The nurse sees it, the intern sees it and I see it (or if I do not I ask the reason why). If the urine contains many sulfonamide crystals when it is first passed it looks muddy. The crystals soon settle into a yellowish brown layer at the bottom of the container. Orders are given that, if the freshly passed urine appears muddy, the fluid intake is to be increased or the sulfonamide dose decreased, or both. If the urine appears bloody, the sulfonamide medication is stopped until further orders from the physician in charge. A fluid intake of at least 2,500 cc. and a urine output of at least 1,500 cc. are, of course, always insisted on. Since the renal complications of sulfonamide therapy are the result of the precipitation of crystals in the urinary tract, and since such precipitation is discernible in the voided specimen, muddy or bloody urines are respectively interpreted as "caution" or "stop" signals, which, if promptly heeded, will prevent accidents.

John H. Arnett, M.D., Philadelphia.

DENTAL CARIES AND DIET

To the Editor:—Evidence based on clinical and experimental research indicates that dental caries may be caused by an insufficient intake of certain minerals and vitamins or to the ingestion of excessive amounts of sweets and other carbohydrates.

The sugars and flours from which these carbohydrate foods are made are those which, through processing, have been deprived of many of the vitamins, amino acids and minerals they naturally contained. As a result such diets are more or less deficient in elements essential for their normal cellular metabolism.

Timothy Leary and others have presented both clinical and experimental evidence to indicate that "atherosclerosis, the important form of arteriosclerosis, is a specific disease due to excess cholesterol" (The Journal, July 25, 1942, p. 1041) or to excessive intake of fats.

In man, much of the fat in the diet comes from butter, cream and egg yolk; some from vegetable or other animal fats and oils. Certain minerals, vitamins and essential amino and fatty acids are required for the normal cellular metabolism of the lipoids. They are present in whole milk, whole eggs and some of the natural animal and vegetable fats in adequate amounts. They are not present in adequate amounts in butter, cream, egg yolk, some of the other animal and certain of the commonly used vegetable fats and oils.

There is also evidence that dental caries does not develop when a diet high in carbohydrates but containing adequate minerals, amino acids and vitamins is consumed. Then there is immunity to caries. Similarly the experimental production of atherosclerosis in laboratory animals can be inhibited when the high fat or high cholesterol diet contains adequate amounts of the minerals, vitamins, hormones, and essential amino and fatty acids required for their normal cellular metabolism.

Therefore would it not be more accurate to state that the results of clinical and experimental research indicate that dental caries and atherosclerosis may be due to relative dietary deficiencies than it is to ascribe such lesions to an excess of carbohydrates, cholesterol or fats in the diet?

N. S. Davis III, M.D., Chicago.

FAILURE OF SULFONAMIDE DRUGS TO INTERFERE WITH ANTIBODY RESPONSE

To the Editor:—A recent editorial (The Journal, May 23, p. 346) comments on the failure of sulfonamide drugs to interfere with spontaneous antibody responses to pneumococcic infections as illustrated by Curnen and MacLeod's (*J. Exper. Med.* **75**:77 [Jan.] 1942) experimental observations with rabbits. In the course of that editorial, papers of Kneeland and Mulliken (*J. Clin. Investigation* **19**:307 [March], 735 [Sept.] 1940) and of Bukantz and de Gara (*J. Immunol.* **39**:195 [Sept.] 1940) are quoted to illustrate unfavorable results of antibody study in cases of human pneumococcic pneumonia treated with sulfonamide drugs. The figures attributed to Bukantz and de Gara are somewhat misleading in this regard, since the figures had been incorporated in the paper quoted only in a discussion of a method of testing for pneumococcus precipitins in human serums. When the precipitin reaction is the sole immunologic test employed (as by Kneeland and Mulliken) antibody responses are of low frequency because the precipitin reaction is considerably less sensitive than is the agglutinin reaction in detecting the low titers of antibody which develop in the convalescent case of pneumococcic pneumonia.

This subject is discussed more fully in a later paper of Bullowa, de Gara and Bukantz (*Arch. Int. Med.* **69**:1) in which the complete figures on human antibody responses are given. During that investigation 65 patients treated with sulfapyridine alone were studied. Of these, antibodies were detected in 45, or 69.2 per cent (table 1, p. 3). The serums of 22 of the antibody producers gave a precipitin reaction as well as an agglutinin reaction, while the serums of the remaining 23 were positive by the agglutinin reaction alone. Thus, if the precipitin reaction alone had been utilized to demonstrate antibody, only 22 of 65, or 33.8 per cent, would have been detected, instead of the 69.2 per cent detected when the agglutination test was employed. Our clinical conclusions were therefore in agreement with those of Finland, Spring and Lowell (*J. Clin. Investigation* **19**:179 [Jan.] 1940) and with the experimental observations of Curnen and MacLeod; i. e., antibodies develop in sulfapyridine treated subjects with about the same frequency as in untreated subjects.

Samuel C. Bukantz, Washington, D. C.
First Lieutenant, M. C., Army Medical School.

BIBLICAL QUOTATION

To the Editor—Will you kindly call attention to an error in Biblical quotation on page 922 of The Journal, July 18, made by Dr. Post. "The years draw nigh when thou shalt say 'I have no pleasure in them'" is not to be found in the Lamentations of Jeremiah but is the first sentance in the twelfth chapter of the book of Ecclesiastes attributed to King Solomon.

It is an unintentional error quoted probably from memory. The corrected version reads:

> Remember now thy Creator in the days of thy youth
> While the evil days come not
> Nor the years draw nigh when thou shalt say
> I have no pleasure in them.

Aaron Brav, M.D., Philadelphia.

THIAMINE IN THE AMERICAN DIET

To the Editor:—After reading the editorial entitled "Thiamine in the American Diet" in the July 25 issue of THE JOURNAL, I have to ask the following question: Do the figures mentioned represent the actual amount of vitamins in the daily diet as found after cooking, preserving, storing and transporting or do they represent the ideal amount of nutrients without regard to destructive processes? In other words, do these figures give one the true amount of vitamins one takes when one sits down at the table for dinner?

EDMUND F. KOHL, M.D., New York.

COMMENT.—In the study of thiamine in the average American dietary (Lane, R. L.; Johnson, Elisabeth, and Williams, R. R.: *J. Nutrition* **23**:613 [June] 1942) the effort was made to prepare the food, prior to the determination of the thiamine, in a way which represents ordinary kitchen practice. Foods like meats and certain vegetables were cooked before assaying for thiamine, whereas the fruits and the salad vegetables were assayed in the raw state. In other words, the data indicate the amount of thiamine actually eaten in this average American dietary.—ED.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

CHICAGO, Feb. 15-16, 1943. Sec., Council on Medical Education and Hospitals, Dr. H. G. Weiskotten, 535 North Dearborn Street, Chicago.

NATIONAL BOARD OF MEDICAL EXAMINERS
EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, Aug. 29, page 1526.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 15-16. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARIZONA: * Phoenix, Oct. 6-7. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

ARKANSAS: * *Medical.* Little Rock, Nov. 5-6. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, Nov. 5. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Written.* Sacramento, Oct. 19-22. *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Sept. 16. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

COLORADO: * *Endorsement.* Denver, Oct. 6. *Written.* Denver, Oct. 7-9. Application must be on file not later than Sept. 20. Sec., Dr. John B. Davis, 831 Republic Bldg., Denver.

CONNECTICUT: * *Medical. Written.* Hartford, Nov. 10-11. *Endorsement.* Hartford, Nov. 24. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, Nov. 10-11. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DISTRICT OF COLUMBIA: * Washington, Nov. 9-10. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 East Municipal Bldg., Washington.

FLORIDA: * Jacksonville, Nov. 23-24. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, Oct. 13-14. Sec., Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, Jan. 12. Dir., Bureau of Occupational Licenses, Mr. Walter Curtis, 355 State Capitol Bldg., Boise.

ILLINOIS: Chicago, Oct. 13-15. Superintendent of Registration, Mr. Philip M. Harman, Department of Registration and Education, Springfield.

INDIANA: Indianapolis, Jan. 13-15. Sec., Board of Medical Registration and Examination, Dr. W. C. Moore, 301 State House, Indianapolis.

KANSAS: Kansas City, Sept. 15-16. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, March 2-4. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Portland, Nov. 3-4. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, Dec. 8-11. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 8-9. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 17-20. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MICHIGAN: * Lansing, Oct. 14-16. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 203 Hollister Bldg., Lansing.

MINNESOTA: * Minneapolis, Oct. 20-22. Sec., Dr. Julian F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul.

MISSISSIPPI: Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MISSOURI: Kansas City, Oct. 3. Sec., State Board of Health, Dr. James Stewart, State Capitol Bldg., Jefferson City.

MONTANA: Helena, Oct. 6. Sec., Dr. Otto G. Klein, First National Bank Bldg., Helena.

NEW HAMPSHIRE: Concord, Sept. 10-11. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, Oct. 20-21. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: * Santa Fe, Oct. 13-14. Sec., Dr. LeGrand Ward, 135 Sena Plaza, Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Sept. 14-17. Chief, Bureau of Professional Examinations, Mr. H. L. Field, State Education Department, 315 Education Bldg., Albany.

NORTH CAROLINA: December. Sec., Dr. W. D. James, Hamlet.

OHIO: *Endorsement.* Oct. 6. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, Dec. 9. Sec., Dr. J. D. Osborn, Jr., Frederick.

PENNSYLVANIA: Philadelphia, January. Act. Sec., Bureau of Professional Licensing, Mrs. Marguerite G. Steiner, Department of Public Instruction, 358 Education Bldg., Harrisburg.

RHODE ISLAND: * Providence, Oct. 1-2. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

TENNESSEE: Memphis, Sept. 30-Oct. 3. Sec., Dr. H. W. Qualls, 130 Madison Ave., Memphis.

TEXAS: Austin, Dec. 28-30. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas.

UTAH: Salt Lake City, June. Dir., Department of Registration, Mr. G. V. Billings, 324 State Capitol Bldg., Salt Lake City.

VIRGINIA: Richmond, Dec. 8-11. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Charleston, Oct. 26-28. Commissioner, Public Health Council, Dr. C. F. McClintic, State Capitol, Charleston.

WISCONSIN: * *Reciprocity.* Milwaukee, Sept. 16. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

WYOMING: Cheyenne, Oct. 5-6. Sec., Dr. M. C. Keith, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, Sept. 15. Act. Sec., Dr. Robert L. Nugent, Science Hall, University of Arizona, Tucson.

CONNECTICUT: Oct. 10. Address State Board of Healing Arts, 1945 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Oct. 19-20. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 East Municipal Bldg., Washington.

FLORIDA: Gainesville, Oct. 31. Application must be on file not later than Oct. 16. Sec., Dr. J. F. Conn, John B. Stetson University, DeLand.

IOWA: Des Moines, Oct. 14. Dir., Division of Licensure & Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MINNESOTA: Minneapolis, Oct. 6-7. Sec., Dr. J. C. McKinley, 126 Millard Hall, University of Minnesota, Minneapolis.

NEBRASKA: Lincoln, Oct. 6-7. Dir., Bureau of Examining Boards, Mrs. Jeannette Crawford, 1009 State Capitol Bldg., Lincoln.

NEW MEXICO: Albuquerque, Feb. 1. Sec., Miss Pia Joerger, State Capitol, Santa Fe.

OKLAHOMA: Oklahoma City, May, 1943. Sec., Dr. Oscar C. Newman, Shattuck.

OREGON: Portland, Oct. 31. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

SOUTH DAKOTA: Sioux Falls, Dec. 4-5. Sec., Dr. G. M. Evans, Yankton.

WISCONSIN: Madison, Sept. 19. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee.

Ohio Endorsement Report

The Ohio State Medical Board reports 20 physicians licensed to practice medicine by endorsement on April 7, 1942. The following schools were represented:

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
The School of Medicine of the Division of the Biological Sciences		(1937)	N. B. M. Ex.
University of Kansas School of Medicine		(1940)	Kansas
University of Louisville School of Medicine		(1937), (1938)	Kentucky
Johns Hopkins University School of Medicine		(1911) (1921), (1930)	Penna., Maryland
Harvard Medical School		(1913)	Iowa
University of Michigan Medical School		(1937) (1940, 2)	W. Virginia, Michigan
Temple University School of Medicine		(1934)	Penna.
Meharry Medical College		(1922)	Tennessee
University of Tennessee College of Medicine		(1936), (1937)	Tennessee
University of Texas Faculty of Medicine		(1940)	Texas
Marquette University School of Medicine		(1934)	N. B. M. Ex.
University of Wisconsin Medical School		(1938)	Kansas
McGill University Faculty of Medicine		(1910)	New Jersey
University of Sheffield Faculty of Medicine		(1937)	N. B. M. Ex.

New Mexico Endorsement Report

The New Mexico Board of Medical Examiners reports 7 physicians licensed to practice medicine by endorsement on April 17 and May 4, 1942. The following schools were represented:

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Rush Medical College		(1938)	Illinois
University of Illinois College of Medicine		(1933)	Minnesota
University of Kansas School of Medicine		(1926)	Kansas
University of Pennsylvania School of Medicine		(1933)	N. B. M. Ex.
Woman's Medical College of Pennsylvania		(1939)	N. B. M. Ex.
Baylor University College of Medicine		(1938), (1940)	Texas

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Privacy: Publication of Account of Physical Ailment as a Violation of Patient's Right of Privacy.—The plaintiff, Mrs. Barber, suffered from an abnormally large appetite. While so afflicted she seems gradually to have lost weight. She was placed in a hospital for observation and while there newspaper reporters attempted to interview her relative to her condition. In spite of her protests against any publicity being given to the matter, accounts of her condition were prepared and together with a photograph of her, which was surreptitiously taken at the hospital, were distributed to clients of the news services or syndicates with which the reporters and photographer were affiliated or by whom they were employed. The defendant, Time, Inc., utilized the material so distributed as the basis of an article concerning the plaintiff and her condition in a magazine published by it, heading the article "Starving Glutton" and printing the plaintiff's picture, under which was captioned "Insatiable-Eater Barber" and "She eats for ten." The article was the basis of a suit subsequently brought by her against Time, Inc., for a violation of her right of privacy. A judgment was rendered in her favor by the trial court for $1,500 actual and $1,500 punitive damages, and the defendant appealed to the Supreme Court of Missouri, division 1.

The defendant contended that it had the right to publish the article in question because of provisions in the Missouri and Federal constitutions guaranteeing freedom of speech and of the press. In effect, it contended that its right to publish was superior to the right, if any, of the plaintiff to privacy concerning her condition. The existence of a right of privacy, said the Supreme Court, has been recognized on common law principles in thirteen states (including Missouri) and in Alaska and the District of Columbia. Two other states have established the right of privacy by statute. Six states have expressly refused to accept the right by judicial decision and the remaining states have not as yet decided the question. The basis of the right of privacy is the right to be let alone. It has been suggested that what is actually involved in a violation of this right is an "appropriation of an interest in personality." The right to privacy (or personality) is a part of the constitutional right to liberty and pursuit of happiness, which recognizes that the individual does not exist solely for the state or society but has inalienable rights which cannot be lawfully taken from him, so long as he behaves properly. Nevertheless, under our form of government, citizens have duties and obligations to the community and society as well as rights. To preserve rights for himself one must aid in preserving them for all. This requires cooperation with others. No one is entitled to or can have complete isolation. Individual rights must be construed in the light of duties incumbent on individuals as citizens of a free country. At some point the public interest in obtaining information becomes dominant over the individual's desire for privacy. Conduct, either good or bad, or even misfortune, may properly bring persons to public attention, and then such persons are subject to the privileges which publishers have to satisfy the curiosity of the public as to their leaders, heroes, villains and victims. Likewise, freedom of the press was not created merely for the benefit of the press but because it is essential to the preservation of free government and progress of civilization. Therefore, the press, like individual citizens, must not abuse its constitutional rights or overlook its obligations to others.

Thus, continued the court, establishing conditions of liability for invasion of the right of privacy is a matter of harmonizing individual rights with community and social interests. We think they can be harmonized on a reasonable basis, recognizing the right of privacy without abridging freedom of the press. The determination of what is a matter of public concern is similar in principle to qualified privilege in libel. It is for the court to say first whether the occasion or incident is one of proper public interest. If the court decides that the matter is outside the scope of proper public interest and that there is substantial evidence tending to show a serious, unreasonable and offensive interference with another's private affairs, then the case is one to be submitted to the jury. This rule (applied to the facts of this case) does not interfere with the freedom of the press or its effective exercise, but only limits its abuse, and does not violate any of the constitutional provisions on which the defendant relies.

The court, after considering the facts present in the present case, held that it was proper for the case to be submitted to the jury for its determination. The evidence, said the court, indicated that the plaintiff not only did not consent to the publication of any article or picture in connection with her illness but protested against any publicity to the reporters who interviewed her and that her picture was taken by one while the other was trying to persuade her to consent to such publicity. Certainly, said the court, if there is any right of privacy at all, it should include the right to obtain medical treatment at home or in a hospital for an individual personal condition (at least if it is not contagious or dangerous to others) without personal publicity. The public generally understands that the ethics of the medical profession require such matters to be kept confidential. Even if the condition of the plaintiff was of sufficient interest to the public to warrant its publication, said the court, it was not necessary for the defendant to state the plaintiff's name in order to give medical information to the public as to the symptoms, nature, causes or results of her ailment. The plaintiff's name was given, according to the testimony of the representative of the defendant's medical department, even though she knew it was not customary to mention names or addresses of patients in medical books and case histories, because "an attractive picture . . . of a young lady . . . will attract reader's interest." Certainly, said the court, the picture of the plaintiff conveyed no medical information. While the ailment of the plaintiff may have been a matter of some public interest because unusual, certainly the identity of the person who suffered this ailment was not. Whatever the limits of the right of privacy may be, it seems clear that it must include the right to have information given to or gained by a physician in the treatment of an individual's personal ailment kept from publication which would state his name in connection therewith without his consent. Likewise, whatever may be the right of the press, tabloids or news reel companies to take and use pictures of persons in public places, certainly any right of privacy ought to protect a person from the publication of a picture taken without consent while ill or in bed for treatment and recuperation. The court accordingly held that the evidence of the plaintiff as a whole entitled her to recover from the defendant. The court, however, for technical reasons not here material, because of the absence of actual malice on the part of the defendant, held that the jury erred in awarding the plaintiff punitive damages and that the judgment should be confined to an award for actual damages only.

To the extent indicated, the judgment of the trial court was modified.—*Barber v. Time, Inc. 159 S. W. (2d) 291 (Mo., 1942).*

Medical Practice Acts: Statutory Procedure Must Be Followed in Revocation of License.—The petitioner possessed a certificate dated Nov. 19, 1920, issued by the Florida board of eclectic medical examiners, certifying that he had passed the examination required by law and was entitled to practice medicine in the state. In 1941 the defendant state board of public health refused to accept the registration of such certificate on the ground that it had been declared of no force and effect by the board of medical examiners. Accordingly the petitioner prosecuted an original suit in the Supreme Court of Florida requesting that a writ of mandamus be issued to require the defendant to register his certificate.

The order of the board of medical examiners, relied on by the defendant, was dated June 23, 1941. It declared that the petitioner's certificate was "fraudulent, spurious and of no force and effect, and that said license is not recognized in the practice of medicine." The granting of a certificate to practice medicine, said the court, vests in the holder a property right which can be taken away only by strictly following the statutory

procedure. When the record of an order of the board of medical examiners is relied on, it should show on its face jurisdiction both as to parties and subject matter, and no presumption will supply the omission. In the present case, continued the court, it did not appear that the medical board made an attempt to comply with the mandatory requirements of the statute and its action was therefore a nullity and subject to collateral attack. The defendant contended, too, that the form of action adopted by the petitioner was improper because a statutory remedy for review of the board's action was provided by the statute. The Supreme Court held, however, that such statutory remedy was not exclusive. The reason for this, said the court, is apparent when we consider the difficulty that must exist in perfecting a record for statutory review when the aggrieved party was not present and knew nothing of what transpired. No matter what the form of action taken by the board may be termed, if the effect is to deprive the petitioner of his professional right the statute should be followed. Accordingly the writ of mandamus requested by the petitioner was in effect granted.—*State ex rel. Estep v. Richardson, 3 So. (2d) 512 (Fla., 1941).*

Malpractice: Failure to Make Roentgen Examination Following Reduction of Fracture; Partnership Liability. —The minor plaintiff, having broken her arm in or near the elbow, was taken by her mother to the office of the defendant physicians. A roentgenogram was made of the arm and the fracture reduced. Three weeks later the patient's mother complained to one of the defendants of the appearance of her daughter's arm, but no roentgen examination was made at that time. Five weeks after the reduction of the fracture, however, on the demand of the mother, a second roentgenogram was made by the defendants. Subsequently the patient submitted to operations under a general anesthetic on four different occasions by other physicians in an effort to correct a misangulation. The patient, by her mother as next friend, then filed a suit for damages against the defendant physicians, alleging that their negligent and incorrect setting of the patient's arm left the arm weak, disfigured and at an awkward angle and subjected the patient to intense pain and suffering. From a judgment in favor of the plaintiff, the defendant physicians appealed to the court of appeals of Georgia, division No. 1.

The court of appeals said that a physician cannot always effect a cure. He is "only required to possess and exercise the degree of skill and learning ordinarily possessed and exercised under similar circumstances by the members of his profession in good standing, and to use ordinary, and reasonable care and diligence, and his best judgment, in the application of his skill to the case." The general rule, continued the court, is that medical testimony must be introduced, in a case of this nature, to inform the jurors what is a proper method of treatment in the particular case. The court and the jury must have a standard by which to measure the acts of the physician to determine whether or not he exercised a reasonable degree of care and skill. A jury is not permitted to set up and use arbitrary or artificial standard of measurement that it may wish to apply. If a physician possesses the required qualifications and uses ordinary and reasonable care and diligence and his best judgment in the application of his skill to the case, he is not liable merely because his efforts to assist nature in effecting a cure did not bring about the desired result. Any injury resulting from a want of such care and skill, however, constitutes a tort for which a recovery may be had. The court was of the opinion that the jury in the present case was authorized to find that the x-ray was an available and well known instrumentality which would have shown in time to correct it that one of the three things which an expert witness said brought about the misangulation of the arm occurred, to wit, an improper setting, or slip after a proper setting, or, if properly set, a knitting of the break so irregularly as to cause a misangulation, any one of which if not corrected before the healing of the break was complete would result in the deformity. The jury was justified in finding, too, that the failure of the defendants to make use of the x-ray subsequent to the reduction of the fracture was not a mere error of judgment but constituted negligence and a lack of ordinary care and diligence on the part of the doctors.

Among other things, the trial court charged the jury that "if you believe that these defendants in this case were partners, then each is liable for the negligence of the other in carrying on the partnership business; and if you find they are partners, and if you find either of them is liable, then both would be liable." The defendants contended that this charge was erroneous for the reason that there was no allegation in the plaintiff's petition that the defendants were partners, that the petition was brought against the defendants as individuals, and not against a partnership or against the defendants individually as partners and that it was prejudicial to both of the defendants for the court to charge the jury that if one defendant was liable each would be liable for the negligence of the other. In interpreting this charge to the jury, the court of appeals held that the trial court was in effect saying that if the defendants were partners in the particular matter in which they were engaged to set and treat the broken arm, and by reason of this association and relationship each of the partners participated in the treatment, then each of them was the agent of the other and thus each would be liable for the negligent acts of the other done in pursuance of the particular partnership business. The plaintiff's petition alleged, said the court, that the defendant physicians were associated together and the defendants' answer stated that the defendant physicians operated a clinic and that each was present at, and participated in, the reduction of the fracture and its subsequent treatment. In addition to this, the testimony of one of the defendants was to the effect that they were partners. Since the judgment was not against the partnership but was against the defendant physicians, the court of appeals held that the defendants' contention regarding the charge to the jury was not meritorious. Accordingly, the judgment in favor of the plaintiff was affirmed.—*Howell v. Jackson, 16 S. E. (2d) 45 (Ga., 1941).*

Society Proceedings

COMING MEETINGS

American Academy of Ophthalmology and Otolaryngology, Chicago, Oct. 11-14. Dr. W. L. Benedict, 102 Second Ave., S.W., Rochester, Minn., Acting Secretary.

American Academy of Physical Medicine, Boston, Oct. 14-17. Dr. Herman A. Osgood, 144 Commonwealth Ave., Boston, Secretary.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Hot Springs, Va., Sept. 10-12. Dr. James R. Bloss, 418 Eleventh St., Huntington, W. Va., Secretary.

American Clinical and Climatological Association, Princeton, N. J., Oct. 12-14. Dr. James Bordley, Johns Hopkins Hospital, Baltimore, Secretary.

American Congress of Physical Therapy, Pittsburgh, Sept. 9-12. Dr. Richard Kovacs, 2 East 88th St., New York, Secretary.

American Hospital Association, St. Louis, Oct. 12-16. Dr. Bert W. Caldwell, 18 East Division St., Chicago, Secretary.

American Roentgen Ray Society, Chicago, Sept. 15-18. Dr. H. Dabney Kerr, University Hospitals, Iowa City, Secretary.

Colorado State Medical Society (House of Delegates only), Denver, Sept. 23-24. Mr. Harvey T. Sethman, 1612 Tremont Place, Denver, Executive Secretary.

Delaware, Medical Society of, Dover, Oct. 13-14. Dr. W. O. La Motte, Medical Arts Bldg., Wilmington, Secretary.

District of Columbia, Medical Society of the, Washington, Sept. 29-Oct. 1. Mr. Theodore Wiprud, 1718 M St. N.W., Washington, Secretary.

Idaho State Medical Association, Sun Valley, Sept. 16-19. Dr. F. B. Jeppesen, 105 North 8th St., Boise, Secretary.

Indiana State Medical Association, French Lick, Sept. 29-Oct. 1. Mr. T. A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.

Kentucky State Medical Association, Louisville, Sept. 27-Oct. 1. Dr. Arthur T. McCormack, 620 South Third St., Louisville, Secretary.

Michigan State Medical Society, Grand Rapids, Sept. 22-25. Dr. L. Fernald Foster, 2020 Olds Tower, Lansing, Secretary.

Mississippi Valley Medical Society, Quincy, Ill., Sept. 30-Oct. 2. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

Nevada State Medical Association, Reno, Sept. 24-26. Dr. Horace J. Brown, 120 North Virginia St., Reno, Secretary.

Oregon State Medical Society (House of Delegates only), Portland, Sept. 12-13. Dr. John R. Montague, 1020 S.W. Taylor St., Portland, Secretary.

Pennsylvania, Medical Society of the State of, Pittsburgh, Oct. 5-8. Dr. Walter F. Donaldson, 500 Penn Ave., Pittsburgh, Secretary.

Vermont State Medical Society, Montpelier, Oct. 1. Dr. Benjamin F. Cook, 154 Bellevue Ave., Rutland, Secretary.

Virginia, Medical Society of, Roanoke, Oct. 5-7. Miss Agnes V. Edwards, 1200 East Clay St., Richmond, Secretary.

Washington State Medical Association (House of Delegates only), Seattle, Sept. 12-13. Dr. V. W. Spickard, 1305 Fourth Ave., Seattle, Secretary.

Wisconsin, State Medical Society of, Milwaukee, Sept. 14-16. Mr. Charles H. Crownhart, 110 East Main St., Madison, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

12:281-338 (June) 1942

*Staphylococcemia 1931-1940: Five Hundred Patients. W. J. MacNeal, Frances C. Frisbee and Margaret A. McRae, New York.—p. 281.
Infectious Mononucleosis Simulating Acute Appendicitis, with Description of Specific Lesion of Appendix. R. Straus, Cleveland.—p. 295.
Hemolytic Transfusion Reactions: III. Prevention, with Special Reference to Rh and Cross Match Tests. A. S. Wiener, Brooklyn.—p. 302.
Use of Heparinized Blood in Studies with Congo Red and Bromsulphalein. I. E. Gerber and Marya Fryczynski, Jersey City, N. J. —p. 312.
Wassermann Reaction in Infectious Mononucleosis, with Special Reference to Kolmer Test. J. A. Kolmer, I. W. Ginsburg and Elsa R. Lynch, Philadelphia.—p. 316.
Primary Liver Cell Carcinoma in Infancy: Report of Two Cases, One Showing Calcification. W. J. Tomlinson, Santa Barbara, Calif., and E. Wolff, Montgomery, W. Va.—p. 321.
Nonspecific Fixation of Complement (Guinea Pig Serum) by Three Lots of Kolmer Antigen. B. E. Diamond, with technical assistance of Berneice M. Iverson, Vermillion, S. D.—p. 328.

Bacteriophage Treatment of Staphylococcemia.—From the data on 500 cases of staphylococcemia MacNeal and his associates conclude that staphylococcic infection occurs at all seasons with little variation. There is an apparent rise in the recovery rate during the fall months. Staphylococcemia occurs at all ages in both sexes. The prognosis of the disease is distinctly less favorable after 40. The staphylococci isolated from the blood stream are generally susceptible to the (in vitro) action of bacteriophages now available. Early recognition of signs and symptoms, skill and willingness to carry through the rather exacting program of bacteriophage therapy and the use of accessory therapeutic measures appear of greatest significance for a high rate of recovery. Only 5 (17 per cent) of 30 patients who did not receive bacteriophage therapy survived as compared to 18 of 25 who received bacteriophage during the metastatic stage of the disease. Of the remaining 445 patients, 137 died before the end of the third day after bacteriophage treatment was started. These are arbitrarily considered as moribund patients. Of the 308 who received bacteriophage earlier, 142 (46 per cent) survived. Of the total 470 patients who received bacteriophage therapy, 160 (34 per cent) survived. Bacteriophage in conjunction with other agents, particularly sulfathiazole and fractional transfusions, offers a more favorable outlook in the severe forms of staphylococcic infection.

American Journal of Diseases of Children, Chicago

63:1019-1232 (June) 1942

Period of Resistance in Early Childhood: Its Significance for Development of the Problem Child. E. Benjamin, Baltimore.—p. 1019.
Respiration of Premature Infants: Response to Variations of Oxygen and to Increased Carbon Dioxide in Inspired Air. J. L. Wilson, Susan Brockett Long and P. J. Howard, Detroit.—p. 1080.
Respiratory Metabolism in Infancy and in Childhood: XXVI. Calorimeter for Measuring Heat Loss of Premature Infants. R. Day and J. D. Hardy, New York.—p. 1086.
Ratio of Cardiovascular Malformations to Other Types of Heart Disease in Children. J. H. Wallace, Oak Park, Ill.—p. 1096.
Prophylactic Use of Human Serum Against Contagion in Pediatric Ward: Further Observations, with Special Reference to Measles and Rubella. L. H. Barenberg, W. Levy, N. M. Greenstein and B. Greenberg, New York.—p. 1101.
*Childhood Appendicitis. S. S. Jacobson, Charleston, S. C.—p. 1110.
Blood Volume of Newborn Infant in Relation to Early and Late Clamping of Umbilical Cord. Q. B. DeMarsh, W. F. Windle and H. L. Alt, Chicago.—p. 1123.
Children's Feet, Normal and Presenting Common Abnormalities. F. A. Chandler, Chicago.—p. 1136.

Childhood Appendicitis.—From a statistical investigation of 918 children up to 12 years of age with nonperforating and perforating appendicitis, Jacobson finds that a definite correlation of diagnostic and prognostic importance exists between the degree of leukocytosis (with its associated proportional rise of polymorphonuclear leukocytes and temperature) and the incidence of peritonitis. There was no relation between the leukocytosis and the incidence of appendical abscess. The leukocyte-pulse rate index aided in determining the degree of resistance of patients with peritonitis. Chronic appendicitis as a definite clinical entity is comparatively unusual in childhood (39 cases among the series) and occurs most frequently after repeated subclinical attacks. Sulfanilamide orally and parenterally to patients with peritonitis apparently definitely reduces the mortality (8.9 per cent during 1934 and 1935, 4 per cent during 1936, 1937, 1938 and 1939 to 0 in 1940) and morbidity of perforating appendicitis.

American Journal of Tropical Medicine, Baltimore

22:191-312 (May) 1942

Occurrence of Two Significantly Distinct Races of Endameba Histolytica. J. J. Sapero, E. G. Hakansson, Washington, D. C., and C. M. Louttit, Panama, Republic of Panama.—p. 191.
Amebiasis and Hookworm Infection as Found in Approximately 50,000 Fecal Examinations in Mississippi. Hannah S. Nickel, Jackson, Miss. —p. 209.
Criteria of Immunity and Susceptibility in Naturally Induced Vivax Malaria Infections. M. F. Boyd, Tallahassee, Fla.—p. 217.
Treatment of Malaria. W. S. Dove, Barranquilla, Colombia.—p. 227.
Subspecific Variations Among Neotropical Anopheles Mosquitoes and Their Importance in Transmission of Malaria. L. E. Rozeboom, Baltimore.—p. 235.
Keg Shelter as Diurnal Resting Place of Anopheles Quadrimaculatus: Introduction. G. E. Smith, Wilson Dam, Ala.—p. 257.
Studies on Copper Arsenite, New Anopheline Larvicide. E. H. Hinman, R. L. Crowell and H. S. Hurlbut, Wilson Dam, Ala.—p. 271.
Studies on Concentration and Distribution of Paris Green-Lime Mixtures Applied as Anopheline Larvicides. R. S. Howard Jr. and J. Andrews, Atlanta, Ga.—p. 283.
Studies on Immunologic Relationships Among Various Species of Genus Candida (Monilia). D. S. Martin, Durham, N. C.—p. 295.
Maturation of Ascaris Ova in Sea Water: Possible Factor in Dissemination of Ascariasis in American Samoa. P. W. Wilson, Bethesda, Md.—p. 305.

Annals of Otol., Rhin. and Laryngology, St. Louis

51:293-576 (June) 1942. **Partial Index**

Otolaryngologic Problems of Aviation in World War II. P. A. Campbell, Randolph Field, Texas.—p. 293.
*Clinical and Experimental Studies with Sulfapyridine as Hemostatic Agent. B. P. Cunningham, Rochester, Minn.—p. 301.
Otology and Aviation. R. A. Fenton, Portland, Ore.—p. 333.
*Nutritional Deficiencies in Otolaryngology. S. E. Roberts, Kansas City, Mo.—p. 358.
Otitis Externa. W. D. Gill, San Antonio, Texas.—p. 370.
Ameloblastoma of Left Maxillary Sinus. M. G. Golden, Brooklyn.—p. 378.
Upper Respiratory Infection of Fulminating Character Requiring Tracheotomy. C. H. McCaskey, Indianapolis.—p. 389.
Effect on Hearing of Experimental Occlusion of Eustachian Tube in Man. W. E. Loch, Baltimore.—p. 396.
Chronic Granular Pharyngitis. R. H. Marcotte, Nashua, N. H.—p. 406.
Fractures of Face Involving Nasal Accessory Sinuses. J. B. Naftzger, Hollywood, Calif.—p. 414.
Gunshot Wounds of Frontal and Temporal Bones. R. Henner, Chicago. —p. 424.
Multiple Benign Sarcoid of Upper Respiratory Tract. D. L. Pope, New York.—p. 430.
Medical Research and War Problems: Forewarned is Forearmed. J. M. Sutherland, Detroit.—p. 445.
Cancer of Larynx. F. E. LeJeune and P. J. Bayon, New Orleans.—p. 460.
Ear Drops in Acute Otitis Media: Evaluation of Various Medicaments and Analysis of Untoward Effects of Antipyrine and Benzopyrine. M. S. Ersner and M. Saltzman, Philadelphia.—p. 471.
Etiology of Myringitis Bullosa Hemorrhagica: Preliminary Report. B. H. Senturia and S. E. Sulkin, St. Louis.—p. 476.
Treatment of Bacterial Meningitis of Rhinogenic Origin. R. Kramer and M. L. Som, New York.—p. 499.
Encephalomeningoceles in Nasal Cavities. O. D. McGillicuddy, Lansing, Mich.—p. 516.
Treatment of Deafness and Tinnitus Aurium with Prostigmine. H. Schluederberg, Philadelphia.—p. 526.

Sulfapyridine as Hemostatic Agent.—Cunningham found that the application of powdered sulfapyridine and sulfamethylthiazole to experimental wounds in the horse, guinea pig and rabbit uniformly controlled vascular oozing. The results of the experiments confirmed his observations in cases of delayed and secondary tonsillar hemorrhage in which the drugs also successfully controlled persistent bleeding. A 40 per cent solution of sodium sulfapyridine was equally efficacious experimentally. The exact mechanism at work is open to conjecture. Sulfanil-

amide and sulfathiazole powders and talc had little hemostatic value. The beneficial drugs, finely powdered, were easy to apply if they were kept dry and were insufflated by a powder blower directly on the surface of the wound. The tonsillar hemorrhage in the patients treated was not amenable to routine management. The routine postoperative use of sulfapyridine in the tonsillar fossa might tend to prevent secondary hemorrhage.

Nutritional Deficiencies in Otolaryngology.—Roberts suggests that the following symptom complex be considered a syndrome: postnasal discharge without sinus infection, nasal stuffiness or seeming obstruction, sinus pain without sinus infection and fatigue without organic changes. These and many other symptoms, such as auditory neuritis without discoverable etiology and nervous psychoneurotic symptoms without positive signs, are frequently present. Postnasal discharge is the most common; it causes much clearing of the throat, cough, a sensation of fulness and sometimes actual choking sensations. Nasal fulness or obstruction is frequently alternating from side to side and is worse when lying down and in the early morning. The chief dietary faults are excessive use of sugar and white flour. To investigate the nutrition properly a careful history of the diet must be taken. Four well known factors that deplete the body of vitamin B complex are excessive alcohol, excessive smoking, excessive intake of carbohydrates and the pernicious habit of cathartics. The author has given over seven hundred intravenous doses of riboflavin 2 mg., pyridoxine hydrochloride 1 mg., pantothenic acid (as the calcium salt) 1 mg. and nicotinamide 100 mg. He has added to the foregoing 50 mg. of thiamine hydrochloride. He is convinced that the results obtained with this medication are more satisfactory than when only nicotinamide was used intravenously or orally. Eight to ten intravenous doses over three to four weeks are usually needed to replenish the depleted vitamins. Therefore oral administration may be ample for maintenance.

Archives of Internal Medicine, Chicago

69:931-1140 (June) 1942

*Intermediate Action of Mixtures of Soluble Insulin and Protamine Zinc Insulin. A. R. Colwell, J. L. Izzo and W. A. Stryker, Evanston, Ill.—p. 931.

Distribution of Specific Types of Hemolytic Streptococci in 819 Cases of Infection. C. S. Keefer, Boston; L. A. Rantz, San Francisco; H. H. Shuman, Fitchburg, Mass., and C. H. Rammelkamp, Boston. —p. 952.

Effect of Morphine and Dilaudid on Ileum and of Morphine, Dilaudid and Atropine on Colon of Man. H. F. Adler, A. J. Atkinson and A. C. Ivy, Chicago.—p. 974.

Quantitative Studies of Direct Reacting Serum Bilirubin. A. Cantarow, C. W. Wirts Jr. and G. Hollander, Philadelphia.—p. 986.

Carbohydrate Combustion in Human Subjects After Oral and After Intravenous Administration of Dextrose. H. F. Root and T. M. Carpenter, Boston.—p. 997.

Blood Pyruvic Acid in Heart Disease. Z. A. Yanof, Chicago.—p. 1005.

Effect of Undernutrition on Cardiac Output and Cardiac Work in Overweight Subjects. A. M. Master, Jenny Stricker, A. Grishman and S. Dack, New York.—p. 1010.

Persistence and Recurrence of Toxic Goiter Following Subtotal Thyroidectomy. F. W. Preston and W. O. Thompson, Chicago.—p. 1019.

Cardiometric Studies on Children: III. Report of Case of Incomplete Heart Block Due to Vagal Effect. W. Poel, Bethesda, Md.—p. 1040.

Blood: Review of Recent Literature. F. H. Bethell, C. C. Sturgis, R. A. Hettig and O. T. Mallery Jr., Ann Arbor, Mich.—p. 1051.

Mixtures of Soluble and Protamine Zinc Insulin.—The need in severe diabetes of an insulin with an action between that of soluble and that of protamine insulin prompted Colwell and his associates to investigate the effects of mixtures of the two insulins on 3 patients (respectively 66, 62 and 56 years of age) with mild diabetes mellitus. None had used insulin routinely, and none had shown any previous rapid change in severity of their diabetes. All were fed every four hours, day and night, throughout the experimental period of two or three months. All injections were made subcutaneously and all traces of insulin effect from a previous injection were allowed to disappear before a subsequent injection was made, a process usually requiring three to four days. Regular insulin in sufficient quantity added to protamine zinc insulin increased the promptness and intensity of the sugar reducing response. The response depended on the proportion of regular insulin added. The response was uniform and therefore predictable within the limits of error involved in any form of insulin therapy. Practical application of the mixtures was restricted to observation of 12 selected patients with severe diabetes of the juvenile type. The mixtures used contained 60 to 75 per cent of ordinary insulin and 40 to 25 per cent of protamine zinc insulin in single daily doses. With supplementary injections of soluble insulin the severe diabetes of 8 of 9 patients who were previously imperfectly controlled on protamine zinc insulin was under decidedly better control with a single daily dose of a 2 to 1 or 3 to 1 mixture than with a single daily dose of protamine zinc insulin supplemented by one or two small daily doses of soluble insulin. One patient reverted to separate injections after trying a 3 to 1 mixture for three weeks; an infection of the respiratory tract during the trial period probably vitiated the results. The diabetes of the other 3 patients was satisfactorily controlled with protamine zinc insulin alone; control was fully as good with a 2 or 3 to 1 mixture. The chief difficulty was a tendency to hypoglycemia in the late afternoon. For some patients reducing the total dose or increasing the noon meal and a midafternoon feeding were sufficient to prevent hypoglycemic symptoms without increases in glycosuria at other times. For others, mixtures containing less soluble insulin may be preferable. In practically all instances there was a substantial reduction in dose necessary when mixtures were used.

Archives of Pathology, Chicago

33:735-958 (June) 1942

Plastic Studies in Abnormal Renal Architecture: VI. Investigation of Circulation in Infarcts of Kidney. Dorothy Loomis and Cecelia E. Jett-Jackson, Brooklyn.—p. 735.

Normal and Abnormal Mitotic Activity: I. Comparison of Periodic Mitotic Activity in Epidermis, Renal Cortex and Submaxillary Salivary Gland of Albino Rat. C. M. Blumenfeld, Cleveland.—p. 770.

Fibrous Dysplasia of Bone: Condition Affecting One, Several or Many Bones, the Graver Cases of Which May Present Abnormal Pigmentation of Skin, Premature Sexual Development, Hyperthyroidism or Still Other Extraskeletal Abnormalities. L. Lichtenstein and H. L. Jaffe, New York.—p. 777.

Comparative Pathology of Epidemics of Poliomyelitis Occurring in Los Angeles County in 1934-1935 and 1939. E. M. Hall, R. M. Van Wart and C. B. Courville, Los Angeles.—p. 817.

Changes in Retention of Copper and Iron in Liver and Spleen in Chronic Diseases Accompanied by Secondary Anemia. Marta Sandberg, H. Gross and Olive M. Holly, New York.—p. 834.

Effect of Weight on Development of Mammary Carcinoma in Various Strains of Mice. L. Loeb, V. Suntzeff, H. T. Blumenthal and M. M. Kirtz, St. Louis.—p. 845.

Osteochondritis Deformans of Hip (Legg-Perthes Disease) and Renal Osteitis Fibrosa Cystica: Report of Case with Anatomic Studies. E. A. Gall and G. A. Bennett, Boston.—p. 866.

Histogenesis of So-Called Grawitz Tumor. W. Schiller, Chicago.—p. 879.

Simpler Classification of Mammary Tumors. N. C. Foot, New York. —p. 905.

Secondary Cancer of Spleen. P. A. Herbut and F. R. Gabriel, Philadelphia.—p. 917.

Canadian Medical Association Journal, Montreal

46:525-634 (June) 1942

*Epidemiology of Encephalitis: Western Equine Type, Manitoba, 1941. C. R. Donovan and M. Bowman, Winnipeg, Man.—p. 525.

*Clinical Findings in Encephalitis (Western Equine). J. D. Adamson and Sara Dubo, Winnipeg, Man.—p. 530.

Shock. P. G. Weil, Montreal.—p. 538.

Prevention of Experimental Thrombosis by Dicoumarin. D. Ursula Dale and L. B. Jaques, Toronto.—p. 546.

Scurvy in Montreal. D. G. Cameron and E. S. Mills, Montreal.—p. 548.

Varicose Veins, Simple and Complicated. L. T. Barclay, Toronto. —p. 551.

Treatment of Acute and Chronic Salpingitis. A. B. Nash, Victoria, B. C.—p. 554.

Control of Physical Hazards of Anesthesia. R. M. Tovell and A. W. Friend, Hartford, Conn.—p. 560.

Carcinoma of Colon and Rectum. G. Miller, Montreal.—p. 565.

Some Notes on Purulent Pericarditis. T. E. Brown, Lethbridge, Alta. —p. 569.

Complete Heterotaxia Associated with Obstructive Jaundice. A. X. Rossien, Kew Gardens, N. Y.—p. 572.

Transuretheral Prostatic Resection. F. Pilcher, Calgary, Alta.—p. 575.

Allergy to Liver Extract. E. P. Scarlett and D. S. Macnab, Calgary, Alta.—p. 578.

Routine Treatment of Acneform Eruptions. K. A. Baird, West St. John, N. B.—p. 580.

Epidemiology of Western Equine Encephalitis.—In reporting the epidemic of poliomyelitis and encephalitis in Manitoba in 1941, Donovan and Bowman state that encephalomyelitis in horses was on the wane when the human cases started. Only 9 persons who contracted the disease gave a history of having had contact with sick horses. Thus spread by such contact may probably be ruled out, except for the few

cases in which direct blood infection may have taken place through an abrasion in the skin. Patient contact may be entirely ruled out, barring accidental inoculation. However, in spite of this there were many cases of mild illness which may have represented subclinical infection. It is not known how the virus enters or leaves the body, but it can be isolated from the brain, cerebrospinal fluid and blood during certain periods of the disease. Toward the end of the epidemic a physician made a complete survey of 120 cases (50 urban and 70 rural). The patients' homes and families were visited, histories obtained and patients examined. From the mass of information obtained and studied the following facts stand out: 1. Almost 100 per cent were exposed to mosquitoes. 2. Many cases were first diagnosed as sun and heat stroke. 3. Owing to the war, many people were short of help and worked overtime; that is, they were overworked. Many older people who had retired started to help and worked harder than they had for years. 4. No significant information as to occupation was elicited, except that outdoor workers predominated. Many birds and animals may harbor the virus. The reservoir may be some insect vector. More work must be done on birds, animals and biting insects common to the various areas where encephalitis appeared. There were 78 deaths, giving a case fatality rate of 15.3 per cent.

Encephalitis (Western Equine).—The widespread epidemic of western equine encephalitis in Manitoba offered an excellent opportunity for Adamson and Dubo to study the clinical signs and symptoms. They examined 266 patients with a tentative diagnosis of encephalitis who were admitted to hospitals in Winnipeg and St. Boniface. The diagnosis was confirmed in 212, who constituted 50 per cent of all cases notified in the province. Subjectively the dominant features were headache in 96.3 per cent, disturbance of sleep in 71.3 per cent and spinal pain in 62.3 per cent. The characteristic constitutional effects were not unlike those of deep alcoholic intoxication: drowsiness, indifference, thick speech and staggering gait. The neurologic signs were like those in disseminated sclerosis: nystagmus, intention tremor, absent abdominal reflexes, an up-going toe and jerky speech. The great difference from case to case was not in the variation in the symptoms present but in the intensity of all signs and symptoms. An extremely mild case of encephalitis may produce a picture almost identical with that of poliomyelitis, and unless there is tremor, nystagmus or monocytic spinal fluid or a flaccid paralysis supervenes, differentiation cannot be made without a serologic test.

Cancer Research, Baltimore

2:381-452 (June) 1942

*Relationship Between Dietary Deficiency and Occurrence of Papillary Atrophy of Tongue and Oral Leukoplakia. J. C. Abels, P. E. Rekers, H. Martin and C. P. Rhoads, New York.—p. 381.
Mastopathia Cystica and Mammary Carcinoma. J. W. Logie, Ann Arbor, Mich.—p. 394.
*Further Observation on Serum Acid Phosphatase Activity of Prostate. C. C. Herger and H. R. Sauer, Buffalo.—p. 398.
Blood Cell Factors in Metastasis of Brown-Pearce Tumor. A. E. Casey, New Orleans; Louise Pearce, Princeton, N. J., and P. D. Roshah, New Britain, Conn.—p. 401.
Transamination in Liver from Rats Fed Butter Yellow. P. P. Cohen, New Haven, Conn.; G. L. Hekhuis and Eva K. Sober.—p. 405.
Metabolic Studies in Mouse Leukemia: I. Metabolism of Lymph Nodes in Lymphoid Leukemia. V. E. Hall and J. Furth, New York.—p. 411.
Inhibition of Autoxidation of Aldehydes by Carcinogenic Chemicals and Related Compounds. W. L. Wasley and H. P. Rusch, Madison, Wis.—p. 422.
Induction of Tumors with Extracts from Human Livers and Human Cancers. P. E. Steiner, Chicago.—p. 425.
Studies on Carcinogenesis in Rabbits: I. Malignant Tumors Induced in Cottontail Rabbits by Injection of Methylcholanthrene in Tricaprylin. J. T. Syverton, G. P. Berry and H. E. Dascomb, Rochester, N. Y.—p. 436.

Dietary Deficiency and Leukoplakia.—Abels and his associates examined 17 adults with papillary atrophy of the tongue, 29 with lingual, buccal, mucosal, gingival and cheilar leukoplakia and 21 with both lingual and cheilar leukoplakia to determine their relative etiologic importance to tobacco, syphilis and dietary deficiencies. For controls the following subjects were examined: 25 normal adults, 20 women with mammary cancer, 12 males and 13 females with gastric cancer and 10 men and 5 women with leukemia. These subjects were studied only to ascertain the incidence of syphilis, excessive smoking and dietary deficiency among them. The figures for syphilis, excessive use of tobacco, history of dietary deficiency, dietary deficiency or gastric achlorhydria and dietary deficiency, gastric achlorhydria or hepatic insufficiency for the 17, 29 and 21 patients and 25 normal subjects were respectively 0, 18, 59, 76 and 82 per cent; 11.1, 55, 55, 61 and 65; 4.5, 46, 61, 81 and 81, and 4, 8, 12, 0 and 16. The incidence of dietary deficiency and excessive use of tobacco were high among the patients with papillary atrophy of the tongue, with oral leukoplakia and with combinations of these lesions. The dietary deficiency of many patients was confirmed by the finding of a low plasma level of vitamin A and low urinary excretion of riboflavin. The pathologic changes associated with papillary atrophy of the tongue and oral leukoplakia presented by the patients studied were hepatic dysfunction, anatomic and functional abnormalities of the gastrointestinal tract, anemia, ungual deformities, cheiloses and perlèche. Hepatic dysfunction and gastrointestinal abnormalities might have contributed to the dietary deficiency. Large quantities of brewers' yeast given to patients with papillary lingual atrophy or oral leukoplakia occasionally resulted in a complete or partial remission of the lesions and oral symptoms. This suggests a relationship between such lesions and an inadequate intake of certain dietary factors present in yeast.

Serum Acid Phosphatase in Carcinoma of Prostate.—Herger and Sauer determined the serum acid and alkaline phosphatase of 430 patients; 283 suffered from a variety of diseases other than prostatic cancer, and 147 were diagnosed as having carcinoma of the prostate. The value for serum acid phosphatase activity in the 283 control cases was invariably below 6 King-Armstrong units, but 77 of the 147 had a serum acid phosphatase level below 4 units once or on repeated determinations. Only 1 patient was shown to have a serum acid phosphatase activity of more than 6 units. Twenty-two patients had a serum acid phosphatase level of from 4 to 6 units. These values represent borderline figures which are diagnostic for metastatic osseous lesions from carcinoma of the prostate only if further elevation takes place. With one exception such an elevation was not encountered in the controls or in patients not suspected of having osseous metastasis from carcinoma of the prostate. Definite metastasis to the bones, demonstrable roentgenologically, was present in 39 of the 147 patients. In 4 the serum acid phosphatase level was below 4 King-Armstrong units, in 2 between 4 to 6 and in 33 it was above 6 units. The data presented are limited to figures obtained on patients prior to castration or diethylstilbestrol medication. A relationship between the degree of the elevation of serum acid phosphatase and the extent of metastatic osseous involvement could not be established.

Georgia Medical Association Journal, Atlanta

31:223-262 (June) 1942

Granulosa Cell Tumors of Ovary. W. R. Holmes and A. E. Hauck, Atlanta.—p. 223.
Operative Management of Chronic Gastric and Duodenal Ulcer. L. Grove, Atlanta.—p. 227.
Induction of Labor by Bougies. T. S. Gatewood, Americus, and R. Torpin, Augusta.—p. 233.
Diabetes Mellitus in Negro. T. L. Byrd, Atlanta.—p. 238.
Human versus Material Values in Medical Practice. C. W. Roberts, Atlanta.—p. 242.
Osteomyelitis: Report of Case. I. B. Cantor, Atlanta.—p. 249.

Illinois Medical Journal, Chicago

81:425-490 (June) 1942

Influence of War on Practice of Medicine: President's Address. C. H. Phifer, Chicago.—p. 448.
Treatment of Thyrotoxicosis. W. H. Cole, Chicago.—p. 453.
Current Experiences with Endameba Histolytica Infection in Chicago. E. Rodaniche and W. L. Palmer, Chicago.—p. 458.
Pollutions—Psychic and Somatic Study. E. W. Hirsch, Chicago.—p. 463.
Thrombosis of Intracranial Venous Sinuses in Middle Ear Suppuration. J. R. Lindsay, Chicago.—p. 467.
Diethylstilbestrol. S. D. Soule, St. Louis.—p. 474.
Avulsion Fracture of Tibial Tubercle. S. W. Raymond, Chicago.—p. 476.
Tryparsamide Therapy and Impairment of Optic Nerve. H. M. Buley and E. C. Albers, Champaign.—p. 477.

Journal of Clin. Endocrinology, Springfield, Ill.

2:279-350 (May) 1942. **Partial Index**

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Excessive Uterine Bleeding: Antigonad Effect of Prolactin. G. J. Hall, Sacramento, Calif.—p. 296.
Comparative Clinical Effects of Orally Administered Alpha Estradiol and Diethylstilbestrol on Postpartum Engorgement of Breast. A. W. Diddle, S. F. Nagyfy and R. L. Sells, Iowa City.—p. 307.
Effect of Estrogenic Therapy on Decubitus Ulcers of Large Rectocele. S. Wimpfheimer and M. Feresten, New York.—p. 309.
Studies on Etiology of Human Breast Disease: I. Urinary Excretion of Follicle Stimulating Hormone, Estrogens and 17-Ketosteroids in Adolescent Mastitis of Males. I. T. Nathanson, Boston.—p. 311.
*Syndrome of Nocturnal Frequency Alleviated by Testosterone Propionate. R. B. Greenblatt, Augusta, Ga.—p. 321.
Testosterone Propionate in Treatment of Angina Pectoris. L. Hamm, Boston.—p. 325.
Some Metabolic Effects of Testosterone Implants. J. Eidelsberg, M. Bruger and M. Lipkin, New York.—p. 329.
Malignant Pheochromocytoma of Adrenal Medulla (Paraganglioma): Report of Case Simulating Carcinoma of Adrenal Cortex with Secondary Adrenal Insufficiency. T. H. McGavack, J. W. Benjamin, F. D. Speer and S. Klotz, New York.—p. 332.
Potassium Tolerance Test as Aid in Diagnosis of Adrenal Insufficiency. I. Jaffe and C. Byron, Brooklyn.—p. 339.

Testosterone Propionate and Nocturia.—Greenblatt implanted pellets of testosterone propionate subfascially for the treatment of various gynecic disorders in 63 women from 25 to 58 years of age. Evaluation of complaints yielded the information that 28 were regularly disturbed two to ten times by urgency after retiring. Frequently diurnal frequency and dysuria were associated with the nocturia. Of the 28, 3 were menopausal cases and 19 had uterine fibromyomas with or without menstrual irregularities. In each of the 28 the nocturnal frequency was wholly or in greater part alleviated after pellet implantation. In several the symptoms partially or wholly recurred after the pellets were completely absorbed. The amelioration of frequency following steroid therapy may be a direct sequence to the action of the substance on renal function, tone of the bladder, pituitary activity, water balance, electrolyte metabolism or some other mechanism at present not understood. From 25 to 400 mg. of sterile crystalline testosterone propionate in pellets may be implanted subfascially without fear of arrhenomimetic phenomena.

Journal Industrial Hygiene & Toxicology, Baltimore

24:125-164 (June) 1942

Significance of Chemical Examination in Diagnosis of Silicosis. L. U. Gardner and A. J. Redlin, Saranac Lake, N. Y.—p. 125.
Prevention and Control of Hazards in Radium Dial Painting Industry. L. F. Curtiss, Washington, D. C.—p. 131.
Physiologic Action of Metallic Magnesium. S. F. Meek, J. J. Prendergast, G. C. Harrold and C. P. McCord, Detroit.—p. 142.
Magnesiogenous Pneumagranuloma. R. Z. Schulz and C. W. Walter, Boston.—p. 148.
Some Recent Observations on Phosphorus Toxicology. R. B. L. Fleming, J. W. Miller and V. R. Swayne Jr.—p. 154.
Testimony Before Commission and Court. W. A. Bishop, Boston.—p. 159.

Journal of Investigative Dermatology, Baltimore

5:107-148 (June) 1942

Benign Embolic Pyemid. P. Balog, Cairo, Egypt.—p. 107.
Further Studies in Arsphenamine Hypersensitiveness in Guinea Pigs: IV. Vitamin A (Carotene) in Relation to Sensitization of Guinea Pigs to Old Arsphenamine. W. Frei, New York.—p. 117.
Determination of Urinary Coproporphyrin I Using Commercial Hematoporphyrin as a Standard. P. L. Ewing, Galveston, Texas, and T. Cornbleet, Chicago.—p. 127.
Thiamine Hydrochloride—an Obligate Wheal Producing Agent. F. Kalz, Montreal, Canada.—p. 135.
Urinary Excretion of Nicotinic Acid in Various Dermatoses. S. I. Greenberg, Brooklyn.—p. 139.
*Effects of Pyridoxine (Vitamin B6) on Persistent Adolescent Acne. N. Jolliffe, L. A. Rosenblum and J. Sawhill, New York.—p. 143.

Pyridoxine for Adolescent Acne.—Jolliffe and his co-workers used pyridoxine for the treatment of 37 of 72 patients with persistent adolescent acne; the remaining 35 patients were used as controls. The condition of 9 of the 37 was cleared, of 19 improved, of 6 unchanged, and 3 dropped from treatment. The respective figures for the controls were 0, 7, 19 and 9. The initial dose of pyridoxine was 25 mg. two times a day. This was increased as necessary to 250 mg. (50 mg. five times a day) in several subjects before the lesions definitely improved or actually cleared. Irrespective of the degree of improvement of the acne there was a decrease in the oiliness of the skin. Generally it took seven to ten days of continued administration of the effective dose of vitamin B_6 to obtain definite improvement. Improvement remained stationary without treatment in only 4 subjects. In the others relapses occurred when treatment was withdrawn. It is doubtful whether in the 4 the apparent improvement was due to pyridoxine. It is suggested that the physiologic function of pyridoxine is connected with utilization of the unsaturated fatty acids; pyridoxine probably functions through its corrective action on a deranged fatty acid or lipid metabolism. This suggestion would not invalidate the concept of a direct physiologic action of pyridoxine on the activity of the sebaceous apparatus of the skin and the reduction in the oiliness of the skin.

Journal of Lab. and Clinical Medicine, St. Louis

27:1111-1230 (June) 1942

Pulmonary Cerebral Effect Time as Determined by Amyl Nitrate: I. Establishment of Normal Range. M. H. Uhley, Chicago.—p. 1111.
Regulation of Reciprocal Activity of Desoxycorticosterone Acetate and Sodium in Addison's Disease. T. H. McGavack, New York.—p. 1117.
Significance of Fibrinolysis in Mechanism of Coagulation of Blood. H. J. Tagnon, New York.—p. 1119.
Effects of Polyvinyl Alcohol Injections on Blood and Tissues. W. R. Young, A. S. Mulay and A. Christie, San Francisco.—p. 1131.
*Treatment of Arthritis by Electropyrexia Including Some Physiologic Studies During Fever Therapy. S. L. Osborne, D. E. Markson, R. E. Driscoll and J. R. Merriman, Chicago.—p. 1135.
Amount of Plasma and Whole Blood in Lungs of Dogs. J. L. Keeley, Chicago, and J. G. Gibson, Boston.—p. 1144.
Iodine Allergy. L. Pelner, Brooklyn.—p. 1150.
Bacteriologic Check on Residual Dental Infections. M. Murray and Eileen O'Ferrell, Cincinnati.—p. 1154.
Significance of Electrocardiographic Changes in Malignant Hypertension. J. D. Markham and N. Bloom, Richmond, Va.—p. 1156.
Temperature Studies on Intravenous Fluids. N. A. Murray, Tampa, Fla.—p. 1164.
Note on Ineffectiveness of Sulfonamide Compounds in Treatment of Poliomyelitis of Mice. J. A. Kolmer and Anna M. Rule, Philadelphia.—p. 1166.
Changes in Blood Volume Produced by Diabetic Acidosis. S. D. Jacobson and R. H. Lyons, Ann Arbor, Mich.—p. 1169.
Value of Blood Chloride and Sodium Determinations in Diagnosis of Dehydration. W. S. Hoffman and Bess Osgood, Chicago.—p. 1174.
Experimental Production of Hypoalbuminemia by Fasting. R. Elman, L. A. Sachar, A. Horvitz and Harriet Wolf, St. Louis.—p. 1183.

Treatment of Arthritis by Electropyrexia.—Osborne and his co-workers used electropyrexia in the treatment of 27 patients with rheumatoid arthritis whose temperature was elevated by using a fever cabinet in combination with an inductotherm. The intake of fluid (a 0.4 per cent solution of sodium chloride) was limited to 250 cc. for each fifteen minutes of pyrexia unless more could be given without causing distress. Nausea or vomiting was seldom encountered. A rectal temperature of 104 F. was maintained for four hours. In only 6 of the patients were the results sufficiently striking for one year or longer to be classified as definitely improved, 6 were moderately improved, 9 slightly improved and 6 experienced no benefit. In not 1 could the designation "cured" be used.

Journal-Lancet, Minneapolis

62:207-246 (June) 1942

Staphylococcic Ocular Inflammation. J. H. Allen, Iowa City.—p. 207.
Swine Erysipelas and Erysipeloid. W. L. Boyd, St. Paul.—p. 211.
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Cardiac Arrhythmias. W. H. Long, Fargo, N. D.—p. 220.
Abortion and the Law. I. Schermer, Minneapolis.—p. 223.
Disappearance of Tuberculous Lesions. A. T. Laird, Nopeming, Minn. —p. 225.
Fractures of Mandible, with Special Reference to Reduction of Complicated Displacements and Subsequent Immobilization. C. W. Waldron, Minneapolis.—p. 228.
Vision Facts for Visual Reasons. H. S. Kuhn, Hammond, Ind. —p. 240.

Journal of Nutrition, Philadelphia

23:533-658 (June) 1942

Adequacy of Simplified Diets for Guinea Pigs and Rabbits. A. G. Hogan and J. W. Hamilton, Columbia, Mo.—p. 533.
Relationship Between Pantothenic Acid Requirement and Age in Rat. K. Unna and Grace V. Richards, Rahway, N. J.—p. 545.
Thiamine, Riboflavin, Pyridoxine and Pantothenate Deficiencies as Affecting Appetite and Growth of Albino Rat. L. Voris, A. Black, R. W. Swift and C. E. French, State College, Pa.—p. 555.
Effect of High Vitamin A Intake on Blood and Milk Carotene of Holstein and Guernsey Cows. H. J. Deuel Jr., Lois F. Hallman, Cornelia Johnston and F. Mattson, Los Angeles.—p. 567.
Vitamin Content of Honeys. M. H. Haydak, L. S. Palmer, M. C. Tanquary and A. E. Vivino, St. Paul.—p. 581.
Studies on Hemorrhagic Sweet Clover Disease: IX. Effect of Diet and Vitamin K on Hypoprothrombinemia Induced by 3,3'-Methylene-Bis-(4-Hydroxycoumarin) in Rat. R. S. Overman, J. B. Field, C. A. Baumann and K. P. Link, Madison, Wis.—p. 589.
Relation of Sulfur Amino Acids to Toxicity of Cobalt and Nickel in Rat. W. H. Griffith, P. L. Pavcek and D. J. Mulford, St. Louis.—p. 603.
Studies of Average American Diet: I. Thiamine Content. R. L. Lane, Elisabeth Johnson and R. R. Williams, Summit, N. J.—p. 613.
Vitamin E, Cod Liver Oil and Muscular Dystrophy. H. A. Mattill and and C. Golumbic, Iowa City.—p. 625.
Vitamin E Content of Certain Varieties of Wheat, Corn, Grasses and Legumes as Determined by Rat Assay. C. A. Cabell and N. R. Ellis, Beltsville, Md.—p. 633.

Journal of Pediatrics, St. Louis

20:665-804 (June) 1942

Reactions of Children and Youth to Wartime. B. I. Beverly, Chicago.—p. 665.
*Treatment of Type Specific Hemophilus Influenzae Infections in Infancy and Childhood. Hattie E. Alexander, Catherine Ellis and Grace Leidy, New York.—p. 673.
*Observations on Hemophilus Influenzae (Type B) Meningitis of Children. E. Neter, Buffalo.—p. 699.
Chemotherapy of Infantile Diarrhea: Comparison of Sulfathiazole and Sulfaguanidine. R. B. Tudor, Durham, N. C.—p. 707.
Tuberculosis Survey of Household Groups. C. A. Stewart, New Orleans.—p. 711.
Treatment of Whooping Cough Bronchopneumonia. W. P. Frank, E. F. Patton, Los Angeles, and P. M. Hamilton, San Marino, Calif.—p. 720.
Studies of Physical Characteristics of Selected Children in Madrid, Spain, in 1941. W. D. Robinson, Mexico, D. F., Mexico; J. H. Janney, Santiago, Chile, and F. Grande (Covian), Madrid, Spain.—p. 723.
Dark Adaptation of Children in Relation to Dietary Levels of Vitamin A. Helen Oldham, Lydia J. Roberts, Kathryn MacLennan and F. W. Schultz, Chicago.—p. 740.
Nearly Fatal Reaction to Sulfadiazine in Ten Year Old Girl, Involving Skin, Eyes and Oropharynx. J. F. Raffetto and S. Nichols, Asbury Park, N. J.—p. 753.
Hypoplastic Congenital Anemia. I. Rubell, Chicago.—p. 756.
Quantitative Collection of Urine from Infants and Young Children. H. G. Poncher and Jeannette C. Ricewasser, Chicago.—p. 759.

Hemophilus Influenzae Infections in Infancy and Childhood.—The three severe infections in which bacteremia is a constant feature due to strains of encapsulated Hemophilus influenzae are meningitis, obstructive infection of the respiratory tract and pneumonia accompanied by empyema in infants less than 1 year old. According to Alexander and her colleagues susceptibility to bacteremia is due to a lack of immunity of the infant or child, in contrast to the adult, who is relatively resistant to this organism. The difference in this bactericidal property of the blood is believed to be due to antibody. If this assumption is correct, the production of antibody should be possible in patients who recover under sulfonamide without complementary serum therapy. The authors' experience includes evidence of complete recovery of 1 patient with a relatively mild type B H. influenzae meningitis with sulfanilamide alone for five days. The spinal fluid contained 900 cells per cubic millimeter, but no organisms were seen in stained smears, and the sugar and chloride were normal. After three days of incubation the original spinal fluid grew type B H. influenzae. By this time the child's general condition, temperature and spinal fluid showed striking improvement; her serum agglutinated a suspension of encapsulated H. influenzae. The child recovered without serum. Such evidence along with polysaccharide cutaneous tests for detecting antibody may prove of value in separating the patients who require added antibody for recovery from those who have formed sufficient immune substance as a result of a mild infection efficiently suppressed by early chemotherapy. Factors other than antibody, which is so closely correlated with age, play a part. With chemotherapy alone, meningitis of average severity may be held in a static phase for a long period, provided treatment is not interrupted and adequate levels of the drug are maintained. If the infection is mild from the beginning and sulfonamides are started early, the natural antibody formed by the host in response to the infection is sufficient for complete recovery. However, as many institutions and most private practitioners lack facilities for demonstrating free antibody, it is best that all patients suffering from meningitis and obstructive infections of the respiratory tract and infants less than 1 year of age with empyema and bacteremia be given type specific rabbit antibody in addition to sulfonamide therapy. Thirty-seven of the authors' 50 patients with meningitis recovered, as did 14 of 20 with infections causing respiratory obstruction.

Hemophilus Influenzae (Type B) Meningitis in Children.—Neter reports his observations in 62 cases of Hemophilus influenzae meningitis in children. A study of the incidence of bacteremia revealed that H. influenzae was present in the blood of 11 out of 17 children. In 4 the location of foci was the throat and bronchi. Laryngotracheobronchitis necessitated tracheotomy in 2 patients with H. influenzae meningitis. In 3 patients H. influenzae was present in the middle ear. In 1 H. influenzae septicemia with purulent arthritis preceded the meningitis by three weeks. The results of chemotherapy and serotherapy were as follows: 1. Three patients received sulfonamide compounds exclusively; 1 treated with sulfathiazole recovered completely. 2. Two of 12 patients who received anti-H. influenzae horse serum in conjunction with chemotherapy recovered. 3. Of 7 patients who received anti-H. influenzae rabbit serum and chemotherapy 4 recovered completely; 1 of these had two attacks (relapse?) of H. influenzae meningitis within six weeks. Following treatment with rabbit serum antibodies were demonstrated in the blood of 2 patients at a time when viable organisms and specific soluble substance of H. influenzae were present in the spinal fluid. It is suggested that these patients be kept desensitized to the therapeutic serum for several weeks until, as far as it is possible to judge, permanent recovery has been established.

Journal of Thoracic Surgery, St. Louis

11:469-570 (June) 1942

Cancer of Thoracic Esophagus and Upper End of Stomach: Review of Twenty-Three Cases That Have Undergone Surgical Exploration. H. B. Stephens, San Francisco.—p. 469.
Experiences with Eight Cases of Resection of Esophagus for Carcinoma. D. B. Phemister, Chicago.—p. 484.
Experimental Study of Tubes Made from Greater Curvature of Stomach. B. N. Carter, O. A. Abbott and C. R. Hanlon, Cincinnati.—p. 494.
Resection of Esophagus for Carcinoma: Analysis of Experience in Eleven Cases. Y. K. Wu and H. H. Loucks, Peiping, China.—p. 516.
Pulmonary Function After Pneumonectomy in Children. C. W. Lester, A. Cournand and R. L. Riley, New York.—p. 529.
Study Concerning Clinical and Anatomic Features of Reexpanded Lungs Which Had Been Collapsed by Pneumothorax for Variable Periods of Time. B. P. Potter, Jersey City, N. J.—p. 554.
Respiratory Obstruction from Bronchiolar Constriction During Cyclopropane Anesthesia. E. A. Rovenstine and M. L. Phelps, New York.—p. 565

Medical Annals of District of Columbia, Washington

11:209-246 (June) 1942

Why Clinical Research? H. F. Dowling, Washington.—p. 209.
*Problems in Local Use of Sulfonamides. R. G. Klepser, Washington.—p. 211.
Influenzal Meningitis: Evaluation of Therapy and Use of Sulfadiazine. I. B. Brick, Washington.—p. 214.
Childhood Pneumonia: Correlation of Clinical and Autopsy Findings. Virginia L. Cull, Washington.—p. 219.
Study of Poliomyelitis Cases Admitted to Children's Hospital in 1941. R. H. Todd, Washington.—p. 222.
*Reactions from Transfusion of Unpooled Liquid Human Plasma: Analysis of 1,500 Transfusions. J. J. Weinstein, Washington.—p. 226.
Influence of Bacterial Flora on Cultivation of Endameba Histolytica. B. D. Chinn, Washington.—p. 230.

Local Use of Sulfonamides.—Klepser states that more important than the sulfonamide drug to be used is the proper surgical preparation of the wound for the reception of the drug. Sulfonamide therapy is not a substitute for surgical judgment and meticulous care. Deep, pocketed wounds and inaccessible walled off abscesses or draining fistulas are not benefited by the drug unless the wound is first converted into an open acces-

sible area by proper surgical drainage. As there may be limited diffusion into surrounding tissues following local application of the powdered drug, sulfanilamide, which is the most diffusible and readily absorbed, is frequently preferred to the other sulfonamide derivatives. The rapidity of wound healing in their presence is still an unsettled subject. Retarded healing has been reported by some workers, and others have disclaimed this. Biopsies of the wound edges of seventy infected wounds, most of which were undermined infected decubitus ulcers, were taken at frequent intervals during treatment. In no instance was there gross or microscopic evidence that sulfanilamide interfered with the normal physiology of healing. There was no evidence that the drug destroyed fibroblasts or epithelium. However, the powder is slowly absorbed and in fairly clean incised wounds it may prevent early contact of the contiguous edges of the wound, thus slowing healing. But such wounds when healed appear fully as strong as when the drug is not used and there is just as little scar tissue. Its topical application in any contaminated or infected wound is certainly advantageous, but its routine use in clean operative wounds in which normal healing is expected is discouraged. Microscopic sections of the granulation beds of infected ulcerations and infected burns after prolonged use of a powdered sulfonamide derivative revealed that healing gradually became slowed, and granulation tissue appeared pale, dried out, inert and dull. Although infection was controlled, the wounds remained inert and the healing time in them was definitely prolonged. If sulfonamide therapy was stopped healing usually was resumed, but occasionally reinfection occurred. This problem was solved by substituting a greaseless ointment base for the dry powder and by using only 10 per cent of the sulfonamide drug, which proved adequate to prevent infection. To encourage granulation 2 per cent of allantoin was added to the base. Toxic manifestations from local use were infrequent.

Unpooled Liquid Human Plasma.—The reactions which followed fifteen hundred consecutive intravenous infusions of liquid unpooled human plasma are discussed by Weinstein. The infusions were carried out and observed by him throughout the entire period of administration. The plasma was given in variable amounts (the average amount was 500 cc.) by a filter drip method, with varying rates of flow. Fifteen reactions of mild to severe chills with or without a rise in temperature and urticaria in 1 patient occurred. It was not always possible to elicit the cause. Some reactions may be avoided by using fasting donors, using a completely closed and simple method for preparing and storing plasma, repeated bacteriologic studies to insure sterility and by utilizing an accepted, thorough, well defined and well supervised procedure for preparing and caring for all equipment and solutions used in conjunction with the preparation, storage and administration of plasma.

Michigan State Medical Society Journal, Muskegon

41:437-524 (June) 1942

Arterial Hypertension: Forty Years of Retrospect. A. R. Elliott, Chicago.—p. 463.
Chondroma of Tongue. J. Johns, Ionia.—p. 471.
*Is There a Clinical Syndrome Characteristic of Hypertrophic Gastritis? H. M. Pollard and R. R. Cooper, Ann Arbor.—p. 473.
Tularemia Endemic in Southern Michigan. E. P. Cawley, Jackson.—p. 476.
Focal Infection in Nose and Throat: Retrospect and Forecast. D. E. S. Wishart, Toronto, Canada.—p. 478.
Treatment of Facial Wounds Due to Explosions. C. L. Straith, Detroit.—p. 484.
Staphylococcus Meningitis: Case Treated by Sulfadiazine with Recovery. W. S. McCune, Petoskey.—p. 487.
Medicine and the Antitrust Act: Discussion of Government's Suit Against the American Medical Association. W. H. Hamilton, New Haven, Conn.—p. 489.

Hypertrophic Gastritis.—Nearly 25 per cent of 800 patients who had a gastroscopy performed at the University Hospital showed typical morphologic characteristics of hypertrophic gastritis. Pollard and Cooper selected 50 of these patients, entirely free of any other evidence of organic disease, to determine whether or not they presented any consistent clinical picture as a result of their disease. The features which were commonly present and should serve as a diagnostic aid were a burning sensation or discomfort in the epigastrium before, immediately after or in about two hours after eating. The discomfort was at times relieved by food or sodium bicarbonate. Free acid in the gastric contents in normal or increased amounts was common. The roentgenogram revealed no significant change. The disease was more prevalent in men than in women. It was not confined to any particular age group. With such a variable picture the diagnosis appears to depend on direct gastroscopic observation of the gastric mucous membrane. The diagnosis is important, as hypertrophic gastritis is a definite organic disease. Not infrequently it explains the symptoms in patients with gastric complaints but negative roentgenograms. Also hypertrophic gastritis may be the cause of a small or massive gastric hemorrhage; it may be the explanation of significant occult blood in the stool. The gastric analysis showed a maximal free acidity of more than 50 degrees in 58 per cent of the patients; in 18 of these it reached more than 80 degrees. None of the patients showed an achlorhydria in all gastric specimens. As no characteristic clinical syndrome is typical of hypertrophic gastritis, the diagnosis must be made by exclusion and by gastroscopy.

Missouri State Medical Assn. Journal, St. Louis

39:193-232 (July) 1942

Treatment of Acute Perforative Peritonitis: Importance of Operation, Oxygen Inhalations, Plasma Transfusions and Sulfonamides. R. Elman and C. L. Eckert, St. Louis.—p. 193.
Use of Stored Blood and Plasma in Clinical Practice. R. O. Muether, St. Louis.—p. 198.
Carcinoma of Skin: Statistical Analysis of 560 Basal Cell Carcinomas. R. L. Sutton Jr., Kansas City.—p. 203.
How Shall We Treat *Fibroids of* Uterus? W. H. Vogt, St. Louis.—p. 207.

Nebraska State Medical Journal, Lincoln

27:193-228 (June) 1942

Our Challenge. J. E. M. Thomsen, Lincoln.—p. 196.
Dermatologic Fashions. S. W. Becker, Chicago.—p. 199.
Mucocele of Appendix and Pseudomyxoma Peritonei: Clinical and Experimental Study. M. Grodinsky and A. S. Rubnitz, Omaha.—p. 201.
Disability Following Cholecystectomy. R. R. Best, Omaha.—p. 206.
Diverticulum of Urinary Bladder. W. F. Novak, Omaha.—p. 211.
Value of Lanatoside C in Treatment of Heart Disease. M. Margolin, Omaha.—p. 215.

New England Journal of Medicine, Boston

226:787-840 (May 14) 1942

Differential Diagnosis of Acute Appendicitis and Acute Gastroenteritis in College Men. T. B. Quigley and A. W. Contratto, Cambridge, Mass.—p. 787.
Colles's Fracture: Study of X-Ray Films Before and After Reduction. J. W. Sever, Boston.—p. 790.
Essential Dysmenorrhea. M. Fremont-Smith, Boston.—p. 795.
Laboratory Aids in Diagnosis and Prognosis of Heart Disease. L. B. Ellis, Boston.—p. 798.

226:841-872 (May 21) 1942

Sarcoma of Breast: Report of Twenty-Two Cases. H. Rogers, Boston, and S. Flo, Greenfield, Mass.—p. 841.
*Pneumonia: Study of 132 Cases Treated in the Home with Sulfathiazole. J. Rosenthal, W. A. MacColl and J. H. Pratt, Boston.—p. 845.
*Electroencephalographic Studies in Children Presenting Behavior Disorders. L. Secunda and K. H. Finley, Boston.—p. 850.
Artificial Radioactive Isotopes in Medicine and Biology. J. F. Ross, Boston.—p. 854.

Pneumonia Treated with Sulfathiazole.—Rosenthal and his associates report the results of 132 indigent patients with pneumonia treated in their homes during the winter of 1940-1941 by the Domiciliary Medical Service of the Boston Dispensary. The conditions were adverse but, as the total mortality (5 patients, or 3.8 per cent) indicates, pneumonia can be treated successfully in the home by the early use of the sulfonamides. Pneumococci in the sputum were obtained from 70 patients, and 6 had positive blood cultures. The mortality rate for those with pneumococci in the sputum was 6 per cent. Toxic manifestations due to the drug were few, and there were no instances of hemolytic anemia or granulocytopenia. This work represents a financial saving to the community of several thousand dollars that would have been incurred had the patients been treated in hospitals. Supportive treatment consisted mainly

of a high calory diet, sedation for chest pain, general nursing care and the tender ministrations of the patient's own family. No oxygen, digitalis or artificial stimulants were used.

Behavior Disorders in Children.—At the Boston Psychopathic Hospital, Secunda and Finley obtained electroencephalographic tracings of 143 children presenting behavior disorders. A poorly integrated personality was brought out by the number who had a history of neurotic traits (enuresis, nail biting, walking and talking in their sleep); 90 had one or more neurotic traits; 32 had none, and no information was had on 21. Of the 143 children 26 had normal, 23 borderline and 51 per cent abnormal electroencephalograms, whereas of 76 control children 68 had normal, 17 borderline and 15 per cent abnormal tracings. As a group, the electroencephalograms of the children with behavior disorders were more vulnerable to hyperventilation than those of the controls. On the whole there was a progressive increase in normal records and a diminution in abnormal records with increase in age. The intelligence of 24, or 16 per cent, of the children with behavior disorders was inferior, and of these 15 (62 per cent) had abnormal tracings. Of the 119 who had normal intelligence 59 (50 per cent) had abnormal tracings.

226:873-902 (May 28) 1942

Medicine and Air Supremacy. J. F. Fulton, New Haven, Conn.—p. 873.
*Vitamin B_1 and Endurance. P. V. Karpovich and N. Millman, Springfield, Mass.—p. 881.
Keloids and Their Treatment. L. H. Nason, Boston.—p. 883.
Otology: Treatment of Deafness in Light of Recent Animal Experimentation. M. H. Lurie, Boston.—p. 886.

Vitamin B_1 and Endurance.—Karpovich and Millman attempted to determine whether endurance could be improved by a daily dose of 5 mg. of thiamine hydrochloride. Sixty-nine subjects of college age divided into three groups were tested for the time they were able to hold their arms horizontally. The first group were simply told to hold their arms outstretched as long as possible, and their holding time ranged from six to one hundred and eight minutes. The second group were given a "pep talk," and their range of endurance varied from eight to one hundred and thirty-five minutes. The third group, tested two days after the first two groups and naturally who had been talking about the "remarkable" feat of holding the arms outstretched for one hundred and thirty-five minutes, were given an especially emphatic "pep talk," and their range varied from nine to two hundred and sixty minutes. Forty-one of the 50 men whose arm holding times were less than thirty minutes were given either 5 mg. of thiamine hydrochloride a day or a placebo (5 mg. of lactose). A week later these 50 men were given a second test. The range of those given the placebo varied from five to seventy-seven minutes and that of those given the vitamin varied from seven to seventy-nine minutes. In the latter, 8 of 16 improved and, in the former, 12 of 25 improved. The study proved that the arm holding test cannot be used as a test for the effect of the vitamin in apparently normal people or for vitamin B_1 at all because the test is definitely affected by psychologic factors: the "pep talk" and the competitive elements. Also the breath holding test before and after a diet containing 5 mg. of thiamine hydrochloride a day for a week or 5 mg. of lactose was influenced by psychologic factors and not by the vitamin B_1. Therefore neither test appears to be a criterion for determining vitamin B_1 deficiency in apparently normal college students.

226:903-936 (June 4) 1942

Some Remarks on Therapy for Anemia. W. B. Castle, Boston.—p. 903.
Familial Nonhemolytic Jaundice: Report of Case with Liver Biopsy. J. J. Curry, T. J. Greenwalt and R. J. Tat, Boston.—p. 909.
*Pili Torti Hereditaria. B. Appel and S. J. Messina, Boston.—p. 912.
Typhus Fever in Massachusetts: Report of Case Contracted in an Out of State Endemic Area. J. E. Hayes, Northampton, Mass., and C. E. Gill, Westfield, Mass.—p. 916.
Vascular Disorders of Extremities. J. Homans, Boston.—p. 917.

Pili Torti Hereditaria.—The occurrence of hereditary pili torti in 2 sisters is reported by Appel and Messina. Hypoplasia of the enamel of the teeth in the older girl was another characteristic feature that points to ectodermal dysplasia as a probable underlying cause. The authors are in accord with Ronchese that a twisting of the hair on its own axis is the pronounced feature; this should determine the name of the condition—"pili torti"—and "hereditaria" added because of the obvious hereditary character. The cause of the condition is most likely a developmental anomaly. As the patients become older their hair tends to become less abnormal in appearance. The application of hydrous wool fat is the only effective treatment.

226:937-968 (June 11) 1942

*Chest Pain in Patients with Mitral Stenosis, with Particular Reference to So-Called "Hypercyanotic Angina." A. M. Burgess Jr. and L. B. Ellis, Boston.—p. 937.
Syndrome of Cervical Rib with Subclavian Arterial Thrombosis and Hemiplegia Due to Cerebral Embolism: Report of Case. S. W. Hoobler, Boston.—p. 942.
Medical Discharges from Military Service: Report of 600 Cases. D. J. Flicker and O. H. Coleman, Camp Blanding, Fla.—p. 945.
Anthrax: Report of Fatal Case Involving Cutaneous and Gastrointestinal Systems. W. D. MacDonald, Worcester, Mass.—p. 949.
Vascular Disorders of Extremities. J. Homans, Boston.—p. 951.

Mitral Stenosis.—Patients with mitral stenosis, Burgess and Ellis state, may often complain of pain due to cardiac neurosis, active rheumatic carditis, angina pectoris or so-called hypercyanotic angina. In none of these is the pain directly produced by the stenosed mitral valve. These patients are also prone to repeated pulmonary infarction. The pain may be pleural or substernal, especially with massive pulmonary infarctions or emboli. The last three types of pain are severe, squeezing or grinding, located in the precordium or beneath the sternum, radiating to the left shoulder and arm, they bear no clear relation to exertion, emotion or stress and they occur in paroxysms that may last for hours or days. Usually dyspnea, orthopnea and a severe degree of cyanosis are present during attacks, and sometimes circulatory collapse. Peripheral venous congestion may or may not be present. The fever, leukocytosis or electrocardiographic pattern of an acute myocardial infarction are not present, and the changes in blood pressure are irregular and in no way characteristic. Oxygen relieves the pain much more effectively than vasodilator drugs. Consequently the pain is probably due to anoxia in a hypertrophic and fatigued myocardium. Postmortem examination shows a high degree of mitral stenosis, with secondary myocardial hypertrophy and pulmonary vascular changes. This symptom complex, which is by no means new, is seen occasionally in most large clinics. It is confusing and often leads to a mistaken diagnosis of myocardial infarction. The subject has received relatively little attention and is not mentioned in most standard textbooks. Mild grades of the syndrome may occur in patients with well defined mitral stenosis, and therefore the syndrome may not be as uncommon as observers believe.

New Jersey Medical Society Journal, Trenton

39:249-310 (May) 1942

Modern Treatment of Urinary Tract Infections. M. Reich, Newark.—p. 261.
Recognition and Management of Cardiac Neurosis. J. B. Wolffe, Philadelphia.—p. 266.
When Are Duodenal and Gastric Ulcers and Gallbladder Disease Medical and When Are They Surgical? M. Kraemer, Newark.—p. 270.
Descent and Prolapse of Uterus and Vagina. A. J. Walscheid, Union City.—p. 274.
Cesarean Operation and New Jersey Maternal Welfare Report: Maternal Welfare Article Number Sixty-Nine. R. A. MacKenzie, Asbury Park.—p. 280.

New Orleans Medical and Surgical Journal

94:567-620 (June) 1942

Physician and Scientist—1850. R. J. Usher, New Orleans.—p. 567.
Charity Hospital and Medical Education. L. B. Weiss, New Orleans.—p. 575.
Asthma Then and Now: Life of Henry Hyde Salter. V. J. Derbes, New Orleans.—p. 582.
Undescribed Fluoroscopic Finding in Solitary Abscess of Liver: Case Report. E. A. Ficklen, New Orleans.—p. 587.
Arrhenoblastoma of Ovary. C. G. Collins, W. Beacham and H. J. Schattenberg, New Orleans.—p. 589.
Tuberous Sclerosis, with Case Study. W. L. Bryan and T. A. Watters, New Orleans.—p. 592.
Bilateral Cortical Necrosis of Kidneys, with Case Report. F. E. Bruno, New Orleans.—p. 596.
Subdiaphragmatic Abscess, with Particular Reference to Surgical Approach. J. G. Snelling, Monroe, La.—p. 599.

New York State Journal of Medicine, New York

42:1121-1214 (June 15) 1942

Bacterial Filtrates in Treatment of Cutaneous Infections. F. C. Combes, New York.—p. 1143.
Blood Studies in Shock as Guide to Therapy: Defense Mechanism of Kidney. J. Scudder, New York.—p. 1146.
Retention of Sphincter in Radical Operation for Carcinoma of Rectum and Rectosigmoid. A. O. Wilensky, New York.—p. 1150.

Ohio State Medical Journal, Columbus

38:513-628 (June) 1942

War and National Health. L. G. Rowntree, Washington, D. C.—p. 529.
Glycosuria Associated with Disease of Biliary Tract. O. Berghausen, Cincinnati.—p. 537.
Trichinosis Encephalitis. R. R. Hays and J. P. Sauvageot, Akron.—p. 538.
Production of Goiter and Myxedema by Sulfocyanates. J. L. Kobacker, Toledo.—p. 541.
Chylous Mesenteric Cyst: Report of Case. R. C. Costello, East Liverpool.—p. 543.
Postoperative Atelectasis: Presentation of Four Cases. J. W. McCall, Cleveland, and M. S. Freeman, Lakewood.—p. 546.
Scabies: Treatment. C. B. Norris, Youngstown.—p. 551.
Fatal Uremia Following Single Exposure to Carbon Tetrachloride Fumes. W. F. Ashe and S. Safler, Cincinnati.—p. 553.
Death Takes a Holiday. C. W. Pavey, Columbus.—p. 556.

Pennsylvania Medical Journal, Harrisburg

45:769-896 (May) 1942

Urinary Obstructions in Infants and Children. M. F. Campbell, New York.—p. 783.
Vaccination During Pregnancy. J. B. Bernstine and G. W. Bland, Philadelphia.—p. 790.
Trichomonas Vaginalis Vaginitis in a Young Infant. J. J. Hersh and R. C. Hamilton, Pittsburgh.—p. 794.
Medical Aspects of Chemical Warfare. I. M. Pochapin, Pittsburgh.—p. 795.
Soft Tissue Repair in Injuries About the Face and Head. K. M. Marcks, Emmaus.—p. 801.
Importance of Gastroscopy in Differentiating Gastric Lesions. C. W. Wirts Jr., Philadelphia.—p. 807.
Food Aspiration Pneumonia. G. H. Fetterman, Pittsburgh, and T. J. Moran, Mayview.—p. 810.
Extraperitoneal Cesarean Section: The Water's Operation and Results in a Series of Twenty-Two Cases. J. R. Eisaman and B. R. Austin, Pittsburgh.—p. 813.
Surgery in the Aged. R. L. Evans and S. N. Key, Sayre.—p. 818.

Public Health Reports, Washington, D. C.

57:773-808 (May 22) 1942

Domestic Water and Dental Caries: IV. Effect of Increasing Fluoride Content of Common Water Supply on Lactobacillus Acidophilus Counts of Saliva. F. A. Arnold Jr., H. T. Dean and E. Elvove.—p. 773.
Housing of Health Departments. J. W. Mountin.—p. 781.
Histopathology of Experimental Q Fever in Mice. T. L. Perrin and Ida A. Bengtson.—p. 790.

57:809-852 (May 29) 1942

Histopathology of Type B (Lee Strain) Influenza in Mice. J. W. Oliphant and T. L. Perrin.—p. 809.
Laboratory Studies of Effect of Sulfonamide Drugs on Vibrio Cholerae. J. J. Griffitts.—p. 814.

57:853-884 (June 5) 1942

Analysis of Industrial Hygiene Activities in State and Local Health Departments, 1940-1941. V. M. Trasko and J. J. Bloomfield.—p. 853.
*Sulfaguanidine Noneffective in Treatment of Typhoid Fever and Typhoid Carriers. J. Watt and J. S. Peterson.—p. 872.

Sulfaguanidine in Typhoid and Typhoid Carriers.—Because of the success obtained with sulfaguanidine in vitro, Watt and Peterson treated 6 hospitalized, moderately ill patients with proved typhoid. They were given 5 Gm. four times a day for eight to ten days. No unusual clinical improvement ensued. The patients recovered, but there was no indication that the drug had any effect on the fever or other clinical signs or symptoms. The cultures of 3 known chronic typhoid carriers, who were treated with 15 Gm. of the drug for fourteen days, were positive at least three weeks after the drug was discontinued. The number of colonies per plate on Wilson Blair medium was not decreased.

Quart. Bull. of Sea View Hospital, Staten Island, N. Y.

7:149-260 (April) 1942

*Spontaneous Pneumothorax in Apparently Healthy Individuals: Clinical Study of Fifty-Eight Cases with Discussion of Pathogenesis. G. G. Ornstein, New York, and L. Lercher, Brooklyn.—p. 149.
Tuberculosis of Genital System. O. Auerbach, Staten Island, N. Y.—p. 188.
Lateral Tomography of Thorax; Study of the Normal. P. Slater, New York.—p. 208.
*Importance of Fever as Diagnostic Sign of Intestinal Involvement in Chronic Pulmonary Tuberculosis: Considerations on Pathogenesis. I. G. Tchertkoff and H. Green, New York.—p. 230.
Treatment of Vaginitis with New Synthetic Phenol Derivative. G. Schaefer, Staten Island, N. Y.—p. 243.

Spontaneous Pneumothorax.—Ornstein and Lercher do not believe that spontaneous pneumothorax in apparently healthy individuals is as rare as Kjaergaard suggested (51 cases from the hospitals in Denmark in more than twenty years) and are presenting their 58 cases encountered in the last twenty years. The material includes only ambulatory patients who came to the office for diagnosis and treatment. The pathogenesis of spontaneous pneumothorax is based on the development of emphysematous blebs in the pleura produced by rupture of the elastic fibers of the subpleural alveoli into the alveolar layer of the pleura. The pleura is lifted and separated from the underlying layer of alveoli. The blebs are formed because the air forced from the bases of the lungs into the apexes of the upper lobes distends and ultimately ruptures the elastic fibers of the alveoli. Air is forced into the upper lobes more frequently in the muscular robust male adult, who is more apt to overdistend his upper lobes by severe exertion when the expiratory and abdominal muscles are contracted, and the glottis is closed. The blebs may form in lungs free of any disease or in peripheral subpleural scar tissue resulting from previous nontuberculous or tuberculous infection. A further step in the pathogenesis is that spontaneous pneumothorax occurs in emphysematous blebs with a check valve mechanism. The bleb, consequently, enlarges and thins out to such an extent that it cannot further resist the increase in pressure and bursts. The extent of the pneumothorax depends on the size of the emphysematous bleb and the elasticity of the adjacent pulmonary tissue. Only 2 of the authors' patients were female. The average age of the group was 28, the youngest being 15 and the oldest 56. Only 10 of 45 gave a history of exertion. Sudden sharp thoracic pain and extreme dyspnea were the principal symptoms. Roentgenograms of the lungs should be taken in deep expiration to detect small pneumothoraces that may be overlooked on deep inspiration. Small pleural effusions occurred in 22. In the 41 who had only one attack the right lung was involved twenty-five times and the left sixteen times. Seventeen had recurrences, and both lungs were involved in 6 of the 17 who had recurrences. In 3 of the 58, pulmonary tuberculosis developed about two years after the lungs were reexpanded.

Fever in Intestinal Involvement.—Tchertkoff and Green present the data from 221 cases to demonstrate that it is not the duration, the extent of the pathologic changes or even the mere presence of tubercle bacilli, but rather the activity and progression of the disease that are the determining factors in the development of intestinal tuberculosis in chronic pulmonary tuberculosis. They chose the temperature curve as a single index of this activity. Only a persistently elevated temperature can be considered as evidence of activity and progression. From the data the conclusion appears warranted that intestinal disease can be diagnosed in a case of pulmonary tuberculosis uncomplicated by empyema when a febrile course of more than two months is exhibited. Intestinal tuberculosis was seen to be directly related to the type of disease present, that is, to the activity and progression of the disease, since in each sex group approximately 95 per cent of patients with fever had evidence of intestinal tuberculosis and in 88 per cent of those without fever this evidence was lacking. Using fever as a criterion, a degree of correct correlation between an elevated temperature and intestinal tuberculosis of 92.5 per cent was obtained. If those with a fever for two months or less were regarded as indeterminate, a correct correlation of 95.7 per

cent was obtained. Therefore a diagnosis of intestinal tuberculosis may be made, in spite of the absence of any other clinical sign or symptom, in those patients with pulmonary tuberculosis who have had a fever for more than two months.

Quarterly J. Studies on Alcohol, New Haven, Conn.

3:1-164 (June) 1942

Relative Effects of Toxic Doses of Alcohol on Fetal, Newborn and Adult Rats. Annette Chesler; G. C. LaBelle and H. E. Himwich, Albany, N. Y.—p. 1.
Influence of Alcohol on Circulation. A. Grollman, Baltimore.—p. 5.
Alcohol and Driving. H. Newman, San Francisco; E. Fletcher and M. Abramson.—p. 15.
Alcohol Absorption from Skin in Man. R. V. Bowers, W. D. Burleson and J. F. Blades, Richmond, Va.—p. 31.
Arrests for Intoxication in Cleveland, Ohio. M. H. Miller, Cleveland.—p. 34.
Alcoholic Personality: Statistical Study. N. Moros, Northport, N. Y.—p. 45.
Alcoholism and Mental Disorder in Massachusetts, 1917-1933. N. A. Dayton, M. Moore, Dorothy A. Kunberger and M. Geneva Gray, Boston.—p. 50.
Alcoholism and Mental Disorder. J. M. Thomas, Wellesley, Mass.—p. 65.
Critique of Present Day Methods of Treatment of Alcoholism. B. Glueck, Ossining, N. Y.—p. 79.
Effect of Insulin on Rate of Disappearance of Alcohol from Stomach. G. Lolli and L. A. Greenberg, New Haven, Conn.—p. 92.
Effects of Acetophenetidin, Acetanilid, Amidopyrine, Aniline and Para-Aminophenol on Rate of Disappearance of Ethyl Alcohol from Blood. N. Rakieten, New Haven, Conn.—p. 97.
Outline of Basic Policies for Research Program on Problems of Alcohol. E. M. Jellinek, New Haven, Conn.—p. 103.

Radiology, Syracuse, N. Y.

38:643-770 (June) 1942

*Parallelism of Coccidioidal and Tuberculous Infections. C. E. Smith, San Francisco.—p. 643.
*Roentgen Diagnosis of Fungous Infections of Lungs, with Special Reference to Coccidioidomycosis. R. A. Carter, Los Angeles.—p. 649.
Roentgen Diagnosis of Fungous Infections of Gastrointestinal Tract. A. K. Merchant, Stockton, Calif.—p. 660.
Coccidioidal Infection in Bone. C. D. Benninghoven, San Mateo, Calif., and E. R. Miller, San Francisco.—p. 663.
Clinicoanatomic Aspects of Lumbosacral Region. V. T. Inman and J. B. deC. M. Saunders, San Francisco.—p. 669.
Thorotrast and Diagnosis of Lesions Involving Lower Spinal Canal. B. H. Nichols, Cleveland.—p. 679.
Roentgen Therapy of Cancer of Breast and Regional Metastases: Preoperative and Nonoperated Cases. M. Lenz, New York.—p. 686.
Characteristic Bone and Joint Changes in Compressed Air Workers: Survey of Symptomless Cases. A. L. L. Bell, G. N. Edson and N. Hornick, Brooklyn.—p. 698.
Roentgen Sign of Early Suppurative Arthritis of Hip in Infancy. L. K. Chont, Oklahoma City.—p. 708.
Simple Calculator for Therapy Exposure Times. L. G. Jacobs, Indianapolis.—p. 715.
Radiation Effects on Blood Vessels: III. Telangiectasis; Effects on Lymph Vessels. J. Borak, New York.—p. 718.

Coccidioidal and Tuberculous Infections.—The previous restriction of the parallelism of coccidioidal granuloma and tuberculosis to the reinfection type, Smith points out, has disclosed that the reinfection type constitutes only a fraction of infections, since in both diseases mild and even subclinical infections are the rule and serious disease is the exception. The principal port of entry of the two infections is the respiratory tract. The subsequent localization, pneumonitis, allergy and focalization of the primary infection are also similar. In both the result may be a walled off lesion, which may calcify. The erythema nodosum of primary coccidioidomycosis, like that associated with primary tuberculosis, occurs soon after allergy is first established, when the patient is hypersensitive. It may possibly be a reaction of the extremely sensitive tissues to the circulating antigen. Postprimary erythema nodosum is rare in either disease. The pathogenesis of coccidioidal granuloma seems to be that of an endogenous reinfection. The primary infection not only does not predispose to the granuloma but actually confers a lasting immunity to exogenous infection. As in tuberculosis, the ability to focalize a coccidioidal infection seems to depend on some unknown quality of the host.

Fungous Infection of Lungs.—After the primary invasion of Coccidioides immitis, Carter states that a number of patients, proportionally small but large in the aggregate, are destined to contract the serious secondary form, coccidioidal granuloma. Primary involvement predominates in the female and does not appear to be related to race, social status or occupation. The secondary form has a definite predilection for male Mexicans, Negroes, Filipinos and Chinese, with occupations entailing special contact with the soil or its products. The secondary stage is essentially granulomatous, with a tendency to abscess formation, while the acute progressive form is especially prone to widespread dissemination. The mortality is customarily stated as 50 per cent. Of the author's 113 patients, 56 per cent are dead. Roentgenograms of the chest were made in 99. Extrapulmonary manifestations were present in most. They consisted in enlargement of superficial lymph nodes, superficial or deep soft tissue abscesses, granulomatous nodules, ulcers or sinuses from adjacent infection in the skin, meningitis and lesions of bones and joints. Roentgenologically, mediastinal adenopathy was the principal single manifestation in 70 of 92 cases in which intrathoracic involvement was present. Hilar involvement was a manifestation in 64 per cent, occasionally without recognizable mediastinal enlargement. Only 19 patients had no evidence of hilar or mediastinal adenopathy. Frank parenchymal lesions occurred in several forms and were usually associated with some degree of mediastinal or hilar adenopathy. Thickening of the bronchovascular pattern, as distinct from definite parenchymal infiltration, was frequent but difficult to evaluate. Diffusely scattered, irregular infiltrations, "mottling," were present in 19 per cent. Indefinite cloudy zones were present in 37 per cent, actual consolidations in 18 per cent, miliary manifestations in 33 per cent, scattered coarse nodular or hazy nodal foci in a few cases, visible air containing cavities in 10 per cent, fine linear shadows in 9 and coarse strand shadows in 14 per cent, solitary, discrete nodal densities in 3 cases, pleural exudate in 25 per cent, lesions accentuated at or located in the apexes or subapexes in 50 per cent, an osseous lesion evident on the film of the chest in 25 per cent, and lymph node (9 per cent) or parenchymal (5 per cent) calcifications were not noticeably more frequent than would be true of a similar number of neutral chests from patients of the same class. It is not known how many of these may be residual from primary coccidioidomycosis. During an acute primary attack the roentgenogram of the chest may most closely resemble tuberculosis or pneumonia. The positive diagnosis still rests mainly on the identification of Coccidioides immitis.

Rhode Island Medical Journal, Providence

25:123-150 (June) 1942

Arthritis. F. B. Cutts, Providence.—p. 127.
History of the Microscope and Early Microscopy. B. E. Clarke, Providence.—p. 131.

Rocky Mountain Medical Journal, Denver

39:397-468 (June) 1942

Management of Lesions of Stomach, Duodenum and Jejunum. F. H. Lahey, Boston.—p. 414.
Anatomy of Angling. J. J. Waring, Denver.—p. 417.
Renal Tuberculosis. E. A. Miller, Denver, and A. Rest, Spivak, Colo.—p. 421.
Pulmonary Tuberculosis Among the Mexican Population of Weld County, Colo.: Study of 1,745 Persons Tuberculin Tested. W. J. Wilson, Greeley, Colo.—p. 432.
Prevention of Herpes Febrilis. J. P. Hilton, Denver.—p. 433.

South Carolina Medical Assn. Journal, Florence

38:137-164 (June) 1942

Aviation Medicine. D. N. W. Grant, Washington, D. C.—p. 141.

Southern Surgeon, Atlanta, Ga.

11:385-462 (June) 1942

Field and Hospital Services for Civilian Defense. G. Baehr, Washington, D. C.—p. 385.
Cancer of Breast. E. Callaway, LaGrange, Ga.—p. 394.
Human Food Needs. P. M. Wilder, Rochester, Minn.—p. 400.
Modified Molded Splint for Fractures of Shaft of Humerus. L. W. Breck and W. C. Basom, El Paso, Texas.—p. 410.
Use of Human Plasma Protein Solutions in Surgery. E. E. Muirhead, J. M. Hill and C. T. Ashworth, Dallas, Texas.—p. 414.
Wounds of Heart. A. R. McComb, San Antonio, Texas.—p. 432.

Southwestern Medicine, El Paso, Texas

26:141-180 (May) 1942

Recent Advances in Thoracic Surgery. J. M. Ovens, Phoenix, Ariz.—p. 142.
Pathologic Physiology of the Liver: I. Regulation of the Blood. J. P. Simonds, Chicago.—p. 147.
Cancer of Cervix and Fundus Uteri. J. R. Maxfield Jr., Dallas, Texas.—p. 154.
Retrobulbar Neuritis: Diagnosis, Etiology and Treatment. H. F. Whalman, Los Angeles.—p. 157.

Surgery, St. Louis

11:841-1004 (June) 1942

*Ludwig's Angina: Analysis of Forty-Five Cases. M. Taffel and S. C. Harvey, New Haven, Conn.—p. 841.
Clinical Significance of Gas in Gallbladder. H. McCorkle and E. E. Fong, San Francisco.—p. 851.
Surgical Treatment of Carcinoma of Stomach in Aged Individuals. R. F. Bowers, New York.—p. 869.
Transthoracic Esophagogastrostomy. C. W. Holman and B. McSwain, New York.—p. 882.
Treatment of Impenetrable Esophageal Strictures by Combined Intraesophageal and Extraesophageal Approach. E. C. Drash and F. D. Woodward, Charlottesville, Va.—p. 886.
Carcinoma of Breast. S. J. Stabins and A. H. Dowdy, Rochester, N. Y.—p. 898.
*Whipple's Disease, or Intestinal Lipodystrophy. H. E. Pearse, Rochester, N. Y.—p. 906.
Surgical Treatment of Spasmodic Facial Tic. W. J. German, New Haven, Conn.—p. 912.
*Observations and Surgical Aspects of Carotid Sinus Reflex in Man. B. S. Ray and H. J. Stewart, New York.—p. 915.
Vitamin A Content of Plasma and Hepatic Tissue Biopsied at Operation: Effects of Preoperative Therapy in Obstructive Jaundice. J. D. Stewart, Buffalo, and G. Margaret Rourke, Boston.—p. 939.
Value of Skin Resistance Studies in Determining Accuracy of Procaine Injections of Sympathetic Nerves. H. B. Shumacker Jr., Baltimore.—p. 949.
Acute Iodism During Treatment of Toxic Goiter. P. Guptill, Rochester, N. Y.—p. 962.
Function of Lower Jaw Following Partial Resection. F. Young, Rochester, N. Y.—p. 966.

Ludwig's Angina.—Taffel and Harvey wish to dispel the myth that Ludwig's angina is a sinister affliction. They believe that the mortality will drop considerably when the disease is recognized early and is treated promptly and judiciously. At the New Haven Hospital over a period of twenty years 45 patients were treated for Ludwig's angina. Forty-six operations were performed on 43 patients and the infection of 2 subsided without operation after an abscess ruptured spontaneously through the floor of the mouth. There were 2 deaths; 1 of these patients had a dissecting aortic aneurysm which had suddenly ruptured into the thorax, and 1 had a concomitant suppurative cavernous sinus thrombophlebitis, pulmonary abscess and pneumonia. The cardinal symptoms of the disease appear early and can be easily recognized. They include a tender swelling in the submandibular area of the neck, elevation of the tongue and edema of the floor of the mouth. The mortality is due not to some overpowering and occult virulence of the infecting organisms but more often to a mechanical obstruction of the respiratory pathway. The primary object of operation, under local procaine hydrochloride anesthesia, is to relieve and to prevent the obstruction by releasing the tension within the submandibular space. This can be accomplished only by complete transection of the deep cervical fascia and the mylohyoid muscle; that is, a thorough decompressive procedure.

Whipple's Disease, or Intestinal Lipodystrophy.—Pearse reports what he believes to be the seventh case of intestinal lipodystrophy. He states that it is the first case diagnosed during life, which made metabolic studies and observations on the effect of treatment possible. The true nature of the case was not established until Whipple examined the material removed at operation and made the diagnosis. Analytic data are presented which suggest that the abnormal fat digestion present in the disease is due to a fault in metabolism of bile salt. This view is strengthened by the clinical response of the patient to the administration of bile salt, but it cannot be proved until suitable analytic methods are available. However, this concept gives a working basis for the management of the disease.

Carotid Sinus Reflex.—The various normal and abnormal activities of the carotid sinus reflex and the significance of the reflex in the field of surgery are reviewed by Ray and Stewart, who state that, when the symptoms are mild or infrequent, reassurance, instruction in avoiding quick movements of the head or pressure on the neck and mild sedatives will often obviate or minimize attacks. Roentgen irradiation may be hazardous, as irradiation of tumors in this region sometimes induces a hypersensitive reflex. Prolonged use of atropine, ephedrine or other comparable drugs to control symptoms is not desirable. When symptoms are severe, surgical denervation of the carotid sinus is indicated. The normal carotid sinus reflex need not of itself be the source of serious complications during surgical procedures, but the fact that a hypersensitive reflex possesses potential dangers deserves wider recognition. It might be well to examine routinely the carotid sinuses of every patient before operation. During operation, in the event of cardiac arrhythmia or asystole, bradycardia, vascular hypotension and possibly convulsions, infiltration of the area between the external and the internal carotid arteries with 1 per cent procaine on the side known to possess a hypersensitive sinus reflex will abolish the reflex and may possibly restore the patient. Simultaneous bilateral anesthetization is not advisable because bilateral laryngeal palsy may ensue.

Tennessee State Medical Assn. Journal, Nashville

35:169-206 (May) 1942

Medicine in the Armed Forces of Our Country. H. A. Laws Jr., Chattanooga.—p. 169.
Stewart-Morel Syndrome or Syndrome of Internal Frontal Hyperostosis. J. P. Gilbert, Nashville.—p. 176.
Consideration of Surgical Treatment of Tumors of the Pancreas. A. O. Whipple, New York.—p. 179.

35:207-250 (June) 1942

Diagnosis and Treatment of Pulmonary Fungous Infections. R. J. Reeves, Durham, N. C.—p. 207.
Neurosurgery and War. C. Pilcher, Nashville.—p. 210.
War and the Nutrition of the Nation. J. S. McLester, Birmingham, Ala.—p. 219.
Local Use of Sulfanilamide in Surgery. C. C. Smeltzer, Memphis.—p. 221.
Obscure Fevers. D. R. Thomas, Knoxville.—p. 226.

Texas State Journal of Medicine, Fort Worth

38:59-184 (June) 1942

Responsibilities and Duties of President of State Medical Association of Texas. N. D. Buie, Marlin.—p. 67.
Crossing the Bar. M. L. Graves, Houston.—p. 72.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

50:271-318 (June) 1942

Use of X-Ray in Obstetrics. H. V. Hartzell, Seattle.—p. 271.
Postpartum Breast Comfort Achieved by Sex Hormone Therapy. R. N. Rutherford, Boston.—p. 282.
Pruritus Ani and Vulvae: Diagnosis and Management. Rachelle Seletz, Los Angeles.—p. 289.
Necrosis of Anterior Pituitary Associated with Pregnancy and Puerperium. R. D. Reekie, Spokane, Wash.—p. 293.
Critical Analysis of 140 Consecutive Cesarean Sections in Five Years at Beth Israel Hospital, New York City. A. D. Seley, New York.—p. 297.

West Virginia Medical Journal, Charleston

38:201-234 (June) 1942

Private Insurance Companies and Suggested Medical Service Plan. R. O. Rogers, Bluefield.—p. 201.
Contact Lenses. A. C. Chandler, Charleston.—p. 211.
Clinical Use of Heparin. C. R. Lam, Detroit.—p. 215.
Circumscribed Scleroderma: Report of Case. L. E. Nolan, Montgomery.—p. 219.
Vaginal Ureterolithotomy. T. J. McBee and C. C. Romine, Morgantown.—p. 221.

Wisconsin Medical Journal, Madison

41:453-528 (June) 1942

Sulfathiazole for Infections in Urinary Tract. R. D. Herrold, Chicago.—p. 467.
Chemotherapy with Sulfonamide Compounds. H. F. Helmholz, Rochester, Minn.—p. 472.
Nontraumatic Rupture of Previously Normal Spleen and Its Medicolegal Aspect: Clinical and Pathologic Report Revealing Embolic Manifestations of Apparently Insignificant Traumatic Injury. L. L. Grossmann, Milwaukee.—p. 477.
Prevalence of Venereal Diseases in Wisconsin. M. Trautmann, Madison.—p. 483.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Journal of Physiology, Cambridge

101:1-136 (June) 1942

Compensatory Mechanism of Splanchnic Circulation During Changes of Posture. O. G. Edholm.—p. 1.
Effect of Partial Pancreatectomy on Concentration of Insulin in Pancreatic Remnant. H. J. Bell, C. H. Best and R. E. Haist.—p. 11.
Effect of Insulin and Anterior Pituitary Extract on Insulin Content of Pancreas and Histology of Islets. C. H. Best, J. Campbell, R. E. Haist and A. W. Ham.—p. 17.
Influence of Weak Electric Currents and Electrically Charged Surfaces on Blood Coagulation. F. Schütz.—p. 27.
Variations in Water, Fat, Glycogen and Iodine of Flesh of Oysters (Ostrea Virginica) During Hibernation and Storage at 4 C. Mary E. T. Baker, E. M. Boyd, Eleanor L. Clarke and Alice K. Ronan.—p. 36.
Mineral Metabolism of Healthy Adults on White and Brown Bread Dietaries. R. A. McCance and E. M. Widdowson.—p. 44.
Diffusion Relations of Urea, Inulin and Chloride in Some Mammalian Tissues. E. J. Conway and O. Fitzgerald.—p. 86.
Effect of Hypertonic Glucose Solutions on Inflow of Normal Saline Solution into Subarachnoid Space of Dog. T. H. B. Bedford.—p. 106.
Method of Conducting a Biologic Assay on Preparation Giving Repeated Graded Responses Illustrated by Estimation of Histamine. H. O. Schild.—p. 115.
Effect of Sodium and Calcium on Toxicity of Potassium in Mice. C. W. Emmens and H. P. Marks.—p. 131.

Lancet, London

1:551-580 (May 9) 1942

Severe Hemorrhage from Stomach and Duodenum: II. General Lines of Treatment. T. I. Bennett, J. Dow and S. Wright.—p. 551.
Splintage of Peripheral Nerve Injuries. W. B. Highet.—p. 555.
*Use of Penicillin in Cultivation of Acne Bacillus. S. Craddock.—p. 558.

Penicillin in Cultivation of Acne Bacillus.—Studies were carried out by Craddock to see whether the acne bacillus was less sensitive to the bacteriostatic action of penicillin than was the staphylococcus. Pus from an acne pustule which contained both acne bacilli and staphylococci showed that it was less sensitive and that by using a concentration of penicillin which inhibited staphylococci a pure culture of acne bacilli could be obtained direct from an acne lesion. The simplest method of obtaining a primary pure culture from an acne lesion, whether or not it contains staphylococci as well as acne bacilli, is as follows: A tube of dextrose broth (p_H 6.8) is boiled to expel dissolved gases. When this has cooled it is inoculated with pus from an acne lesion. Penicillin is then added so that the broth contains a concentration twice as great as had been previously shown to inhibit staphylococcic growth. Hot sterile petrolatum is run on to the surface to a depth of ¼ to ½ inch to exclude air. The tube is then incubated at 37 C. for about sixty hours, when colonies of acne bacilli are perceptible; there is a copious growth in four days. In 47 cases a pure primary growth of acne bacilli was obtained in penicillin-dextrose broth, whereas in dextrose broth without penicillin when staphylococci were present they outgrew the acne bacilli and inhibited their growth. When the primary cultures of acne bacilli were plated anaerobically, two types of colony were observed: Type 1 gave a large heaped-up colony which was a yellowish buff and on blood agar was surrounded with a large zone of hemolysis. The individual bacilli were short, thick, irregular and often clubbed. Type 2 gave small flat colonies and the individual bacilli were longer, thinner and often curved. The two types often occurred in the same specimen of pus. In indolent pustules often seen in acne, type 2 bacilli were found in pure culture. Agglutination reactions in immune rabbits showed that the two types of bacillus were antigenically distinct.

1:581-608 (May 16) 1942

*Hazards of Transfusion. L. E. H. Whitby.—p. 581.
Diffusion of Sulfanilamide, Acriflavine and Gentian Violet. E. A. Lum.—p. 585.
Alcoholic Beriberi Heart. J. C. Bowe.—p. 586.
Efficiency of Rose and Sellors Mask. R. S. Aitken and Alison B. Cruickshank.—p. 587.
*Iron Exchanges of Adults on White and Brown Bread Diets. E. M. Widdowson and R. A. McCance.—p. 588.

Hazards of Transfusion.—The hazards of blood transfusion, according to Whitby, are the systemic nonspecific pyrexial type of reaction due mainly to the apparatus and crystalloid fluids used for transfusion, circulatory and vascular disasters due to the general condition of the recipient, intravascular hemolysis of the transfused blood and transmission of a disease from the donor to the recipient. Most of these hazards are avoidable. The pyrexial reaction with or without rigor can usually be eliminated by scrupulous cleanliness and technic. Experience and good clinical judgment reduce the incidence of circulatory disasters. Intravascular hemolysis from incompatibility will occur from time to time if a haphazard grouping technic is used. If the Landsteiner groups have been correctly determined, the risk of incompatibility is negligible at a first transfusion, but with multiple transfusions and with single or multiple transfusions to pregnant or puerperal women an elaborate direct grouping test and the simple biologic test should never be omitted. The danger of using the same donor for repeated transfusions to the same recipient now seems to be explained by the frequency of rhesus positive individuals who are potentially dangerous donors for multiple transfusions to a rhesus negative recipient. Homologous transfusion is the ideal and is preferred to the routine use of universal donors. There still remain a few reactions which particularly arise in patients with chronic illnesses although every care has been taken in grouping; these suggest that many subtle differences exist in the composition of human erythrocytes of which as yet there is no knowledge.

Iron Exchanges of Adults on White and Brown Bread Diets.—Four men and 4 women took part in experiments on the iron exchanges on diets from which 40 to 50 per cent of the calories were derived from white or wheatmeal bread of 92 per cent extraction. There were ten periods of seven days on white and thirteen periods on diets on wheatmeal bread. Foods, urines and feces were sampled and ashed. The iron in the ashed food and fecal samples was estimated by the thioglycollic acid method (McCance, Widdowson and Shackleton, 1936) and the urinary samples by the thiocyanate method (McCance and Shipp, 1933). The menstrual losses of 3 of the women were characteristically different one from another but definitely constant for any 1 woman from month to month. Iron was absorbed from diets in which white bread constituted 40 to 50 per cent of the total calories, but it was not absorbed from similar diets with the wheatmeal bread. It is suggested that, in spite of the large amount of iron in whole wheat, bread made from such flour may not be as good a source of iron as it is generally supposed. Therefore, brown bread as a source of iron requires further investigation. Meanwhile Widdowson and McCance believe that it may be wiser not to lay too much stress on brown bread as a rich source of iron.

Medical Journal of Australia, Sydney

1:513-542 (May 2) 1942

Bone Marrow in Anemia. T. E. Wilson.—p. 513.
Congenital Lacunar Skull ("Lückenschädel"). H. F. Bettinger.—p. 526.

Practitioner, London

148:257-320 (May) 1942

Modern Treatment of Syphilis. T. E. Osmond.—p. 257.
Treatment of Gonorrhea in Male. H. H. White.—p. 264.
Treatment of Gonorrhea in Women and Children. J. A. W. McCluskie.—p. 273.
Treatment of Congenital Syphilis. L. Findlay.—p. 280.
Need for Cooperative Thought on Industrial Dermatitis. P. B. Mumford.—p. 288.
Cure and Comfort in Cancer. W. H. G. Jessop.—p. 297.
Care of Bladder in Injuries of Nervous System. C. Morson.—p. 305.
Minor Surgery: X. Some Benign Tumors and Cysts. T. T. Higgins.—p. 308.

148:321-384 (June) 1942

Acute Otitis Media. W. M. Mollison.—p. 321.
Acute Mastoiditis: Diagnosis and Treatment. J. D. McLaggan.—p. 327.
Treatment of Chronic Suppurative Otitis Media. A. G. Wells.—p. 334.
The Deaf Adult: Problems of Diagnosis and Treatment. E. M. Woodman.—p. 342.
Child with Defective Hearing: Problems of Diagnosis and Treatment. A. W. G. Ewing.—p. 350.
Adolescents in Industry. H. Bashford.—p. 359.
Preventive Inoculation: Apparatus and Methods. W. P. Phillips and C. W. Anderson.—p. 364.
Note on Removal of Nonviable Tissue. A. Kefalas.—p. 369.
Minor Surgery: XI. Treatment of Varicose Veins, Ulcers and Phlebitis. R. T. Payne.—p. 371.

Annales Pædiatrici, Basel

158:65-176 (No.2/3) 1942

Malaria and Central Nervous System in Children. A. Eekstein.—p. 65.
Lacuna Skull from Intracranial Pressure in Hydrocephalus: Case. Cornelia de Lange.—p. 97.
Serous Meningitis, Ulcerous Stomatitis and Infectious Arthritis with Epiphysial Separation of Left Hip Joint in Scarlet Fever: Case. F. Buser.—p. 110.
Peculiar Case of Congenital Ichthyosis Starting as Exfoliatio Lamellosa, Without Abnormalities. Charlotte Trefzer.—p. 120.
*Pathogenesis of Cooley's Anemia. E. Freudenberg and Margrit Esser.—p. 128.
Enuresis in Structure of Difficult Child. K. Heymann.—p. 166.

Pathogenesis of Cooley's Anemia.—Freudenberg and Esser report 2 cases of Cooley's anemia occurring in brothers, aged 11 and 10, from the German part of Switzerland; they had no Italian blood. The authors emphasize that a strict racial latency is no more valid for Cooley's anemia than for the other forms of mutation anemia. So far, 10 cases have been described which did not belong to the Mediterranean race. The term "Mediterranean anemia" is therefore not justified. As Cooley himself supposed, there are forms of this anemia which pursue a mild course; the 2 reported cases corroborate this. Infectious conditions contribute to the manifestations of Cooley's anemia. The appearance of erythroblasts in the blood is a factor which greatly favors the appearance of Cooley's anemia. In 1 of the 2 reported cases the feces and the bladder bile contained greatly increased amounts of coproporphyrin. The protoporphyrin content of the erythrocytes apparently was increased in both. The bone marrow of both brothers contained numerous erythroblasts with red fluorescence, indicating the presence of porphyrin. The disturbance of the porphyrin metabolism is of particular importance in Cooley's anemia.

Anales de la Facultad de Medicina de Montevideo

26:547-792 (Nos. 8, 9 and 10) 1941. **Partial Index**

Ectopic Testicle: Therapy. L. A. Surraco.—p. 547.
Familial Chagas Disease. R. V. Talice and B. Rial.—p. 623.
*Angina Pectoris of Endocrine Origin. J. T. Fischer.—p. 712.
Phlebography of Varicose Veins of Legs. E. C. Palma.—p. 733.
*Leukogranulocytopenia and Agranulocytosis from Use of Aminopyrine. B. Varela Fuentes, R. Canzani and A. Navarro.—p. 747.

Angina Pectoris of Endocrine Origin.—According to Fischer, anginal symptoms may be caused by endocrine disorders, such as thyroid insufficiency, hyperthyroidism, hypofunction or hyperfunction of the pancreatic islands, ovarian insufficiency and adrenal disorders. Myxedematous angina pectoris, as affected by thyroid therapy, presents four types: (1) myxedema with angina pectoris, both of which disappear on thyroid medication; (2) myxedema without angina, in which the latter appears as a complication of the former when thyroid is given; (3) myxedema with angina, in which the latter is aggravated by thyroid therapy whereas the former is improved; (4) angina without myxedema, which disappears when myxedema appears. The fact that the cardiovascular system of patients with myxedematous angina pectoris of the first clinical type is normal suggests that the condition here is caused by reversible organic changes, namely interstitial edema of the myocardium with compression of the coronary arteries, infiltration of the heart with mucoid and reversible myxedematous enlargement of the heart. The pathogenesis of the second and third clinical types is analogous to that of angina in hyperthyroidism. Angina pectoris of the fourth type is due to certain forms of hyperthyroidism. Typical myxedema developing in these cases plays the role of a spontaneous thyroidectomy by which the angina is controlled. Angina pectoris is a frequent occurrence in hyperthyroidism. The anginal symptoms are frequently overshadowed by those due to hyperthyroidism. Angina in hyperthyroidism is the result of organic cardiovascular lesions. The therapy consists of a thyroidectomy which is indicated even in grave angina. The condition in diabetes is caused by changes in the coronaries. Pain is atypical. It does not yield to analgesics but is controlled by antidiabetic diet and insulin therapy. In angina pectoris of unknown etiology in obese patients with diabetes in the family it is advisable to make blood sugar determinations. The type of angina in hypoglycemia depends on whether the latter is acute or chronic. Pain in acute hypoglycemia simulates an anginal attack of a myocardial infarct, in chronic hypoglycemia that of cardiac insufficiency. The electrocardiograms do not show coronary changes. Angina in a patient with blood sugar content of about 0.80 Gm. per thousand cubic centimeters of blood should be regarded as of hyperglycemic origin. The diagnosis is supplemented by the history, the electrocardiogram and the dextrose therapeutic test. Menopausal angina pectoris caused by ovarian insufficiency is more or less typical. It should be differentiated from menopausal coronary angina. Menopausal angina of ovarian insufficiency and the electrocardiographic alteration regress on administration of estrogen. Angina due to adrenal disorders is especially observed in chromaphin adenoma and in Addison's disease. Pain in chromaphin adenoma is due to angiospasm. It diminishes and disappears as the symptoms of adenoma subside and disappear. Pain in Addison's disease is due to hypoglycemia.

Granulocytopenia from Aminopyrine.—Varela Fuentes and his collaborators report that a woman aged 58 had been taking aminopyrine in large doses in the past for the control of neuralgic pain. The leukocyte count at the time was 2,200, with 44 per cent polymorphonuclear neutrophils. Discontinuance of the drug improved the leukocytic picture, which rose to 6,400 leukocytes with from 55 to 73 per cent polymorphonuclear neutrophils. With the improvement in the leukocytic picture pain diminished and almost disappeared. The bone marrow function continued to improve for one year, when the patient developed pneumonia, in the course of which the leukocytes reached the figure of 17,200, with 87 per cent polymorphonuclear neutrophils. Two years later the patient had an attack of neuralgic pain, for which she took a preparation containing aminopyrine. Edema of the lips and acute agranulocytosis developed with a count of 1,200 leukocytes, with 0.5 per cent polymorphonuclear neutrophils and an ulcerative, necrotic angina. For the last two years the leukocytic picture had been normal with figures varying from 4,250 to 7,100 and 48.5 to 69 per cent polymorphonuclear neutrophils. Intravenous injections of vitamin B_1 controlled the recurring pain.

Boletín de la Sociedad Cubana de Pediatría, Havana

14:113-168 (March) 1942. **Partial Index**

Cholangiopathies in Children. A. Béguez César.—p. 113.
Granular Follicular Conjunctivitis in Children. R. L. Hernández.—p. 135.
*Phimosis in Children. A. Carbonell Salazar.—p. 148.

Phimosis in Children.—Carbonell Salazar reports 1,366 cases of congenital epithelial balanopreputial adhesions in infants, 22 cases of phimosis from balanopreputial adhesions in children and 265 cases of either atrophic or hypertrophic phimosis also in children. When the condition is uncomplicated a spontaneous cure takes place because of repeated erections. Local inflammation and infection from the adhesions are the cause of true phimosis. A simple method of treating adhesions in infants consists in drawing the prepuce back in order to free the glans. The epithelial cellular débris is wiped and liquid petrolatum is applied, after which the prepuce is allowed to return to its normal position. The procedure is repeated for five or seven consecutive days. Atrophic phimosis is due to disproportion between the diameters of the preputial ring and the glans. The treatment consists in dilating the ring with a two bladed dilator and in freeing the glans. If the preputial ring is resistant to instrumental dilation, a simple incision is indicated. Hypertrophic phimosis is due to malformation of the preputial ring which is constituted not by the external and internal layers of the prepuce but by the hypertrophic preputial tissue. Circumcision is here indicated. The frenum should be liberated to secure a permanent result. The most frequent complications of phimosis in children are balanoposthitis and paraphimosis. In the author's cases manual, bloodless or simple instrumental procedures were resorted to in all but 40, in which circumcision was done.

Book Notices

Fundamentals of Anesthesia: An Outline. By Subcommittee on Anesthesia of National Research Council. Fabrikoid. Price, $2.50. Pp. 217, with 72 illustrations. Chicago: American Medical Association Press, 1942.

The Subcommittee on Anesthesia of the National Research Council realized that there was an urgent need for a book on the fundamentals of anesthesia at this particular time. The need was so urgent that finally it was decided that the three pamphlets issued by the American Medical Association in 1937, 1938 and 1939, dealing with the Scientific Exhibit sponsored by the American Medical Association, should be the basis of the small book, which is now available.

Suggestions have been made concerning records. The fundamental physiologic considerations of the transport of oxygen and carbon dioxide in the body are discussed together with the necessity for aids in making the transport system function, and the dangers that occur during anesthesia when the patency of the respiratory system is interfered with. Tables of the symptoms of oxygen want and the symptoms of excessive carbon dioxide are presented. The artificial airways are gone into in considerable detail.

Pharmacologic considerations are presented concerning the various agents consisting of the symptoms that they produce and the treatment to be used for poisoning with them. Tables show the physiologic and pharmacologic properties of inhalation agents and a list of drugs for topical, regional and spinal anesthesia, adjuvants used by anesthetists and sympathomimetic drugs used in combination with anesthetic agents. The signs of anesthesia are described.

Relief of pain is considered in the section on general anesthesia as well as oral and subcutaneous administration, rectal instillation, intravenous instillation and inhalation by both the open and the closed method. The carbon dioxide absorption technic is illustrated and described. Local anesthesia with procaine hydrochloride is described. Field block, infiltration, spinal anesthesia and various nerve blocks are briefly described and well illustrated. Topical applications of local anesthetics is discussed. Certain special technics of analgesia are described. There is a special chapter on operations within the cranial cavity and another concerning anesthesia within the peritoneal cavity and within the pleural cavity.

The question of complications is discussed at some length in outline form. A chapter is devoted to respiratory emergencies, to inhalation therapy and to circulatory emergencies and their treatment. Blood transfusion is discussed as well as the use of serum and plasma. The symptoms, prophylaxis and treatment of heat cramps, heat exhaustion and sunstroke are presented. Convulsions are discussed, coma is presented, and poisoning from both the ordinary and special agents is presented in outline. War gases are named and discussed. Hazards, such as mistakes in writing prescriptions, in identifying patients or the site of operations and in identifying agents, are discussed. Accidents with compressed gases, accidental extravenous injections and the breaking of needles as well as fire and explosion hazards are presented.

Comfort and transport of the wounded are discussed. An appendix is presented giving information concerning compressed gases, how contents of cylinders may be measured, tables of equivalents, and composition of normal urine, normal blood, plasma and cerebrospinal fluid.

The book is indexed and a few pages have been left for notes. This book should be on the must list so far as the anesthetist is concerned.

Ornithologists of the United States Army Medical Corps. Thirty-Six Biographies. By Edgar Erskine Hume, Colonel, Medical Corps, United States Army. With foreword by Alexander Wetmore, Assistant Secretary of the Smithsonian Institution, Washington, D. C. Cloth. Price, $5. Pp. 583, with 110 illustrations. Baltimore: Johns Hopkins Press, 1942.

Most American ornithologists are familiar with the names of Bendire, Cooper, Coues, Heerman and Mearns. Yet few, probably, except those physicians whose hobby is the avian fauna realize that these names belonged to men who were surgeons of the United States Army Medical Corps first and ornithologists but incidentally. As Colonel Hume explains in his introduction to the thirty-six biographies he has collected in this volume, the United States Army in its earlier days was a fighting force only, and when campaigns were not in progress the spare time of the medical officers was frequently used to the benefit of other branches of science than medicine.

Much of the work done by medicomilitary ornithologists in the fifth and sixth decades of the nineteenth century is said to have been inspired by Professor Baird (1823-1887) of the Smithsonian Institution. Baird married the daughter of Colonel Churchill, Inspector General of the Army, through whose influence he was said to have been able to secure the services of young medical officers as naturalists and surgeons of many of the railway and other expeditions in the West. As a result, much of the ornithological work of the Army medical officers is to be found in the "ponderous tomes of the reports of these expeditions."

As an interesting sidelight it is worth noting that, because of the small size of the early United States Army and the insignificant number of medical officers, the rank of the Surgeon General was only that of Colonel. In fact, not until the administration of William Crawford Gorgas was the grade of Major General authorized for the Surgeon General.

In compiling this monograph, Dr. Hume states that he found it necessary to limit the biographic sketches to those of officers of the Regular Army, including acting assistant surgeons (contract surgeons). He admits that the temptation was great to include a number of prominent ornithologists who held emergency commissions in the Army of the United States during the first world war. But such an inclusion was not practical because there was no way of being sure of a complete list, to say nothing of the limitations of space.

Critical ornithologists may argue that the inclusion of at least one or two of the biographies is scarcely warranted by the facts. Surg. Gen. George Miller Sternberg, while a distinguished medical military man and an eminent bacteriologist, could hardly be classed as an ornithologist on no greater submitted evidence than his presidency for some years of the local Audubon society. So too with Leonard Wood, Surgeon and Major General, United States Army. Great man that he was, it seems stretching the facts to list him in a work of this sort as a medicomilitary ornithologist.

One other minor criticism of an otherwise splendid piece of work: The arrangement of the biographies alphabetically makes it less easy to follow the subject as a part of the history of medicine than would be the case if the chronological method had been used.

There are many interesting illustrations and an excellent index to enhance the value of the work.

A Symposium on Human Malaria with Special Reference to North America and the Caribbean Region. Edited by Forest Ray Moulton. Publication of the American Association for the Advancement of Science No. 15. Publication Committee: Mark F. Boyd, Chairman. Cloth. Pp. 398, with illustrations. Washington, D. C.: The Association, 1941.

This symposium, which was held at the Philadelphia meeting of the American Association for the Advancement of Science, Dec. 1, 1940 to Jan. 1, 1941, comes to hand at a time when we are acutely aware of the importance of malaria not only as a public health problem but also because of its prime military significance in certain parts of the world. One needs but recall its contribution to the fall of American resistance on Bataan Peninsula. It is possible in the limits of this review to do little more than mention the topics considered.

The book opens with a historical introduction, and the rest of the material is divided under seven main headings. That on parasitology deals with the distribution of malaria in North America, Mexico, Central America and the West Indies: the taxonomy, morphology, life cycle, physiology and detection of the strains infecting man. The section on anopheline vectors has chapters on the general morphology, distribution, ecology and identification of Anopheles and classification of the nearctic species. There are discussions of the factors influencing infection of Anopheles with malarial parasites and the transmission of malaria by the anopheline mosquitoes of North America. The section on epidemiology deals with cyclical variation in the incidence of malaria in North America. The next section is

concerned with the symptomatology of infection in man due to the various strains of human malaria and also includes a discussion of blackwater fever. The section on pathology and immunity contains chapters on some pathologic aspects of human malaria, the physiologic pathology of malaria, characteristics of immunity, the cellular basis for immunity in malaria and humoral immunity in malaria. The section on treatment considers cinchona and its alkaloids, antimalarials other than quinine, experimental chemotherapy and a summary of ten years of observations on malaria in Panama with reference to control with quinine, atabrine and plasmochin, without anti-mosquito measures. The section on control and eradication contains articles on general considerations in planning malaria control, methods and procedures in malaria survey, methods directed against adult mosquitos, housing, drainage and filling methods, the management of water, petroleum products for mosquito control, paris green and other stomach poisons as larvicides against mosquito larvae, naturalistic methods of malaria control, adaptability of control measures to the nearctic fauna of Anopheles mosquitoes, the adaptability of control measures to the malaria vectors of the Caribbean region and the antimalaria program in North America.

As might be expected, the quality of these articles is not uniform. Many of them are written by recognized leaders in the particular fields. It is to be regretted that so much space is devoted to elementary information and considerations which can be found in most textbooks devoted to the subject. The sections dealing with the anopheline vectors, pathology, immunity and treatment are particularly informative. From the point of view of one who is interested in the mechanisms of infection, the section on pathology and immunity is an excellent survey of the recent work in this field and is far ahead of the usual textbook discussions of the problems involved. A serious lack in the book is its restriction to human malaria, which eliminates to a large extent serious consideration of much of the extensive and exceedingly important experimental work which has been done on other hosts, particularly the birds. At the end of the volume is a fairly comprehensive bibliography, which serves for all the articles.

A Textbook of Surgery. By American Authors. Edited by Frederick Christopher, B.S. M.D., F.A.C.S., Associate Professor of Surgery, Northwestern University Medical School, Chicago. Third edition. Cloth. Price, $10. Pp. 1,764, with 1,538 illustrations. Philadelphia & London: W. B. Saunders Company, 1942.

This popular textbook of surgery has been completely revised and reset. It contains forty chapters written by one hundred and ninety-five American authors, the material having been assembled under the editorial direction of Frederick Christopher. The book is attractively bound and is exceptionally well illustrated and indexed. Following the customary form, the introductory chapters are concerned with wounds, inflammation, tissue repair and injuries due to physical and chemical agents. These are followed by sections devoted to regional surgery. The specialties of neurosurgery, orthopedics, genitourinary surgery, otolaryngology and gynecology are allotted space commensurate with their importance to the general surgeon. This arrangement adds completeness to the work, which is intended to embrace the field of surgery as a whole. Because of the greatly increased interest in the subject of trauma at the present time and since graduating students are expected to be reasonably familiar with the problems of military surgery, the sections on fractures, dislocations and amputations are of special value. A timely addition is a new chapter on war injuries by R. I. Harris of Toronto. The chapter on diseases of the gallbladder and bile ducts, originally written by the late E. Starr Judd, has been thoroughly revised and brought up to date by Howard K. Gray. This includes a discussion of prothrombin clotting time, vitamin K therapy and cholangiography. The section on gastric ulcer has been taken over by Cutler, Zollinger and Bailey and reflects the latest thought on the management of this important lesion. The descriptive material is well elucidated by sketches by Miss Mildred Codding. Other new chapters include (1) diseases of the thymus gland by Alfred Blalock, (2) coccidioidal granuloma by Hiram E. Miller and (3) anal pruritus and hemorrhoids by Newton D. Smith. A convenient bibliography of the more important articles pertaining to the subject is appended to each chapter.

In spite of the rapid pace at which surgical knowledge accumulates, the book presents the most recent information on such matters as the general and topical use of the sulfonamide drugs, surgical treatment of patent ductus arteriosus, Beck's operation for coronary artery disease, the use of heparin, internal fixation for fractures of the neck of the femur, sympathectomy for hypertension and the management of postoperative pulmonary atelectasis.

Since the present trend in the undergraduate teaching of surgery is toward more clinical and less didactic instruction, the student of today must necessarily rely for much of his information on outside reading. Whether the ideal textbook for this purpose is one written for the most part by a single author or is one in which the various subjects are discussed by many men, each a well known specialist and authority in his particular field, is a matter of opinion. If the latter type of textbook is to serve its best purpose, the material must be carefully integrated and edited in order to maintain a proper balance and to avoid undue emphasis on highly specialized subjects. That this has been successfully accomplished by Christopher is apparent from even the most cursory inspection. The work is probably the most complete treatise on surgery today available in a single volume, and yet in spite of its large scope the book remains readable and has not assumed unwieldy proportions. It is a work which is the logical successor of DaCosta's Surgery, which for so many years held a unique place among medical textbooks, and it should prove to be of the utmost value not only to the student but to the house officer and the busy practitioner as well.

Plastic Surgery of the Breast and Abdominal Wall. By Max Thorek, M.D., LL.D., F.I.C.S., Professor of Surgery, Cook County Graduate School of Medicine, Chicago. With an introduction by Rudolf Nissen, M.D., F.I.C.S. With a foreword by J. Eastman Sheehan, M.D., F.A.C.S., Professor of Plastic Reparative Surgery, New York Polyclinic, New York. Cloth. Price, $16.50. Pp. 446, with 458 illustrations. Springfield, Illinois & Baltimore: Charles C Thomas, 1942.

This is no doubt the first book devoted exclusively to this subject. Many books have been written on plastic surgery of the face and extremities, but few volumes have been concerned with the breasts and with the removal of excessive fat. Advances in surgical technic have tended to expand the borders of plastic reparative surgery. Certainly any procedure which will aid to control hypertrophied breasts so as to affect the woman concerned mentally, physiologically and physically and thus to permit her a new life must be considered warranted. The book by Dr. Thorek is a complete consideration of the subject, including history, anatomy, anthropology, ethnology, pathology, surgical indications and contraindications, and technic. Sixteen chapters are devoted to the breasts, and one large chapter to reconstructive surgery of the abdominal wall. The book is based on an extensive experience. It is magnificently illustrated and deserves special recognition as a pioneer in its field.

The History and Evolution of Surgical Instruments. By Dr. C. J. S. Thompson. With a foreword by Dr. Chauncey D. Leake. Cloth. Price, $8.50. Pp. 113, with 115 illustrations. New York: Schuman's, 1942.

Prof. C. J. S. Thompson is widely known as the curator of the Royal College of Surgeons in Great Britain. Much of the material in this book has previously appeared in the *British Journal of Surgery*. The volume traces the development of all the common surgical devices from the scalpel to the operating table. It is well illustrated, beautifully printed, and should make a fine gift volume for any surgeon.

Rabies. By Leslie T. Webster, M.D. Cloth. Price, $1.75. Pp. 168, with 8 illustrations. New York: Macmillan Company, 1942.

Knowledge of rabies has advanced considerably in recent years, but the application of that knowledge is still delayed as evidenced by the fact that rabies has increased in some sections of the United States. The author presents a critical and fairly inclusive consideration of the subject, covering the diagnosis and prevention of rabies. In an appendix information is supplied concerning the disposal of rabid dogs, the licensing of dogs, quarantine, immunization and similar problems. There is also an excellent bibliography and index.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

BLISTERS ON FEET AND COMPOSITION OF SHOES

To the Editor:—The U. S. Army has been resoling shoes with a rubber composition. This results in a certain number of men developing blisters while in the garrison and on the march, as well as definite edema. This office would like to know the percentage of people who are sensitive to rubber, the percentage of people who are sensitive to rubber composition, the percentage of people who are sensitive to wool, the percentage of people who are sensitive to cotton, the percentage of people who are sensitive to leather and whether the glue used to hold the soles may be involved in this sensitivity.

George H. Wood, M.D.,
Captain, M. C., U. S. Army,
Fort Leonard Wood, Missouri.

ANSWER.—The percentage of people sensitive to pure raw rubber itself (latex) is exceedingly low. However, there is a considerable percentage of people sensitive to the compounds placed into rubber in order to make it serviceable. The accelerators and antioxidants used in rubber are the chief sensitizers. In a recent series of experiments with certain reclaimed rubber from six different manufacturers it was possible to sensitize from 2 to 20 per cent of 213 persons given patch tests (Schwartz, Louis, and Tulipan, Louis: A Textbook of Occupational Diseases of the Skin, Philadelphia, Lea & Febiger, 1939, pp. 386-388).

There are no statistics available as to the percentage of people sensitive to wool. It must again be remembered that wool as worn in clothing is not the same as the wool when it comes off the sheep. It is processed with mordants, dyes, oils and finishes, and sensitivity may be induced by any one of these chemicals and not by the wool itself. Despite these facts, it must be borne in mind that millions of people wear processed wool, and the cases of wool sensitivity reported are few and far between (Schwartz and Tulipan, pp. 220-227).

What has been said concerning wool also applies to cotton.

There are no available statistics as to people sensitive to leather. But it again must be borne in mind that leather is a complex product. Hides must be unhaired, tanned, dyed, oiled and similarly treated before they become leather, and any of these chemicals may be retained in the leather and cause sensitization. The dyes and the tanning agents are the principal causes of dermatitis from leather (Schwartz and Tulipan, pp. 323 to 325).

It is difficult to see how the glue used to hold the soles can be implicated as the cause of the blisters on the feet, because the glue would have to go through the insole, the shoe lining and the socks in order to touch the feet.

The fact that a certain number of marching men develop blisters does not necessarily incriminate the rubber composition used for resoling the shoes. It must be borne in mind that the soles of the shoes do not touch the skin. There are inner soles and shoe linings and stockings in between the sole and the skin. It is much more likely that the blisters and edema would be caused by dermatophytosis activated by the perspiration of the feet due to marching. The blisters could also be caused by the friction of shoes and stockings (Schwartz and Tulipan, pp. 561 and 611).

SURGICAL PROCEDURE FOR BRONCHIAL ASTHMA

To the Editor:—Has any surgical procedure ever been tried for the relief of intractable asthma?

Norman P. Rindge, M.D., Clinton, Conn.

ANSWER.—Two surgical procedures have been recommended for the treatment of bronchial asthma. Kummell in 1923 and 1927 reported favorable results from unilateral sympathectomy for bronchial asthma. Gobell in 1928 and Leriche and Fontaine in 1939 also reported favorable results. However, similar operations by other surgeons have been complete failures. Phillips and Scott in 1929 and Riehoff and Gay in 1938 reported bilateral resection of the vagal connections with the posterior pulmonary plexus. This procedure seems, from a physiologic point of view, to be preferable to sympathectomy.

The inconstant results obtained by upper thoracic sympathetic ganglionectomy casts grave doubt on this procedure. Section of the pulmonary vagal branches apparently has given excellent results in some cases, but too few operations have been performed to pass final judgment as to its value.

SURGICAL TREATMENT FOR CHRONIC MAXILLARY SINUSITIS

To the Editor:—What is the present status of operative treatment of chronic suppurative maxillary sinusitis?

Robert E Cloud, M.D., Easley, Birmingham, Ala.

ANSWER.—There is no single or simple answer to this query. Given a case of chronic suppurative maxillary sinusitis and assuming that all the simple and nonoperative procedures have been given a fair trial over a sufficient period, the choice of operative procedure on the sinus itself will lie chiefly between the window operation or intranasal antrostomy and the Caldwell-Luc operation, which is carried out by sublabial approach. The latter intervention has some modifications highly praised by a smaller number of surgeons who practice them in the form of the so-called Denker operation and the intranasal form of the latter perfected by Canfield. In general the intranasal antrostomy, which fell into disfavor for a while because of a tendency for the window to close, has regained popularity by improvements in technic. In its favor, among other things, are ease of performance and less reaction.

The Caldwell-Luc or canine fossa approach has its adherents, who claim for it better opportunity for inspection of the antral contents and easier removal of diseased mucosa. This type of operation is more likely to produce local and general reactions, is harder to do and calls for a lengthier convalescence. Many rhinologists are therefore apt to feel that a well conducted window type of operation should be tried first and converted later on if necessary in the small number of failures into the Caldwell-Luc type of intervention. The proponents of each of these types of operation are clinicians of standing and can be trusted when they say that they get a surprisingly large number of cures, more or less permanent.

HABITUAL ABORTION

To the Editor:—A healthy primipara aged 35, whose serologic reaction and other laboratory work are normal, has miscarried at six months twice within the last eighteen months. The first time she noticed a milky vaginal discharge and felt that the fetus was down too low in the pelvis. On examination it was found that the cervix was already dilated about 2 inches and that the membrane was protruding. Elevation of the foot of the bed, complete rest in bed and narcotics failed to stop the process. The next time her cervix simply got soft, dilated and after dilatation of about 2 finger breadths she was put to bed, the foot of the bed was elevated, progesterone was given intramuscularly, vitamin E was administered, and after she had stayed in bed one month the bag of waters ruptured and she miscarried again at six months. She doesn't have pains until the cervix is fairly well dilated, and there is no bloody discharge when the cervix first dilates. In fact, the bloody discharge does not occur until she is having fairly hard pains. Following the last miscarriage, multiple punctures of the cervix paralleling the axis of the cervical canal were made with a high frequency needle, the object being to cause a deposition of fibrous tissue in the cervix. Would it be advisable for the patient to become pregnant again and what, if anything, can be done to prevent the miscarriages? I feel that they are due to softening of the cervical portion of the uterus with a consequent inability of the uterus to hold the fetus. M.D., Texas.

ANSWER.—Habitual abortion occurring near the period of viability is an unsatisfactory condition to treat. Careful physical and pelvic examinations often reveal a complete absence of any pathologic factor that could predispose to an early termination of a pregnancy. The state of the cervix is rarely the primary cause for the onset of premature labor. At the present state of our knowledge, a failure of the endocrinal mechanism is the most apparent cause for the premature interruption of the pregnancy.

The patient should be encouraged to make another attempt. Prior to conception she should have a complete examination, including a basal metabolism determination. Treatment should be instituted immediately after the missed menstrual period. The patient should receive thyroid in liberal amounts. A good rule to follow is to give 0.065 Gm. (1 grain) a day when the basal metabolic reading is 0 to —10, 0.13 Gm. (2 grains) a day between —10 and —20 and 0.2 Gm. (3 grains) a day between —20 and —30. She should receive vitamin E in the form of mixed tocopherols, a 50 mg. capsule twice daily. Moderate amounts of progesterone, from 1 to 5 mg. in oil, can be given three or four times a week and perhaps daily during the missed menstrual days. All stimuli should be avoided. Coitus, cathartics and douches are contraindicated. The advisability of rest in bed is an open question, but it can do no harm and it may be of value during the missed menstrual periods. These measures should be continued until the fetus is viable. This empirical regimen has as yet little scientific background, but in the absence of accurate knowledge concerning the cause of the condition more rational treatment cannot be recommended. Many clinical reports in the literature confirm the value of this empirical treatment.

PARATHYROID TETANY AND PREGNANCY

To the Editor:—A woman aged 28 had a thyroidectomy six years ago. Since that time it has been necessary for her to take 80 grains (5.2 Gm.) of calcium lactate daily with some form of vitamin D. Otherwise she is in good health. If pregnancy should occur, what would be the effects of calcium metabolism on her and the fetus? How should she be managed; what would be the effect of solution of parathyroid? Several times tetany occurred when oral calcium was discontinued for several days. M.D., Illinois.

ANSWER.—A woman with parathyroid tetany may be carried through pregnancy without complications. The fact that tetany has occurred several times when the administration of calcium was discontinued shows that the patient still has hypoparathyroidism. The treatment of parathyroid tetany is the same during pregnancy as when pregnancy is not present. The most important thing is to maintain the serum calcium at about the normal level.

The best way to do this is to administer large doses of calcium by mouth and supplement it with dihydrotachysterol or concentrated vitamin D_2. The dose of calcium now being administered, namely 80 grains of calcium lactate daily, should be sufficient. The usual maintenance dose of dihydrotachysterol varies from 1 to 4 cc. a week, and the dose of vitamin D_2 that is commonly used is 50,000 U. S. P. units daily. Solution of parathyroid does not play a very important part in the treatment of tetany. Its effectiveness diminishes with continued therapy, so that the dose must gradually be increased to an extremely high level. This makes the material both expensive and unsatisfactory. However, there is no difficulty in controlling tetany with the measures outlined.

Pregnancy has been observed in a patient with parathyroid tetany, and so far as could be noted the offspring was just as normal as if the mother had not had tetany, and no untoward effects were noted in the mother as a result of the pregnancy.

GLOSSITIS IN YOUNG CHILD

To the Editor:—A boy aged 3 years has had glossitis since he was about 8 months of age. It seems to develop periodically in conjunction with a great deal of mucus with the stool. The parent can give no specific time when it develops except anywhere from every two to three weeks to a month. At these particular times the tongue becomes sore and the child has difficulty in eating. The appearance of the lesion seems to take the form of patches, the edges slightly raised and white as of mucus, while the centers of each patch become red and inflamed. I never find it to spread to the buccal mucous membranes or to the throat. The Wassermann reaction is negative. The child at one time was treated for pinworms, but no evidence has been noted of parasites for some time. The mother states that in the past, when the tongue became too sore, application of mild protein silver 20 per cent seemed to relieve it somewhat but that it never cured the condition.

Walter A. Bray, M.D., North Stratford, N. H.

ANSWER.—The glossitis may be due to a local infection, may occur as a result of a deficiency or may reflect the condition of some lower part of the intestinal tract.

To help complete the information, one would have to rule out (by repeated stool examination) a continued infestation, know whether the gastrointestinal tract was normal by a barium sulfate and x-ray series, know whether the abdomen or the liver was enlarged, and know how the child tolerated food, how his nutrition is at present and whether steatorrhea has been present. A complete blood count and bacteriologic studies of the mouth flora would be valuable. Blood vitamin levels may be hard to obtain, but determination of A and C would help decide, by inference, the amount of B present.

The best diagnosis from the evidence given would seem to be celiac disease. It may be present at 8 months of age, it may produce mucus in the stools and it can cause vitamin and other deficiencies by faulty absorption. A trial of high protein diet, excess vitamins (especially B complex) and the use of pancreatic extracts (though this is not invariably thought valuable) would be worth while. The use of iron or an iron and liver extract combination would depend on the results of the blood count.

MENINGOCOCCUS CARRIERS

To the Editor:—In the case of contacts of a meningitis case, is it worth while taking nose and throat cultures, or will the incidence of positive cultures usually be found high in these contacts and therefore of little help in determining which case should be isolated as positive contacts?

Horace L. Wolf, M.D., San Diego, Calif.

ANSWER.—The inquirer has supplied his own answer regarding the search for carriers of meningococci among contacts. There seems to be no value in such a procedure except for academic interest. Should meningitis develop in a carrier who is under medical control, it can be promptly cured in the majority of cases with appropriate sulfonamide drugs.

REFRACTORY URINARY FREQUENCY IN YOUNG GIRL

To the Editor:— A white girl aged 16, unmarried, has a negative past history except for ordinary diseases of childhood. She had a moderately severe attack of influenza one year ago, no complications and uneventful recovery. Immediately after her recovery, frequency of urination developed—no pain, no burning, no straining either before or after micturition—only frequent desire to go (twelve to twenty times in twenty-four hours). The urine has been normal from the beginning of the trouble. The twenty-four hour output is only slightly in excess of normal (2½ to 3¼ pints). There are positively no constitutional or local symptoms other than the ordinary sensation of desire. The mother states that a urologist said the roentgenogram showed a "black spot" on one kidney; but he never showed her the picture. She presents no symptoms of cystitis other than the frequency. For the past five months she has been receiving bladder instillations but is gradually getting worse. The girl and her mother are desperate. It is a humiliating situation. The girl feels that she is an object of ridicule because during school hours she has to go to the toilet so often. She has become extremely self conscious and is practically self ostracized from all student activities and social functions. Now here is a peculiar sidelight: over the week ends, when not in school, she is usually nearly, if not altogether, free of symptoms. That leads me to think that there must be a large psychic factor involved. If, from my rather inadequate description of the case, you concur in that opinion, what would you suggest in the way of management and treatment? Last week, in order to see what the results would be, I took her out of school and she cried as if her heart would break because she is an honor student and wants to graduate. Any suggestions you might be able to offer would be deeply appreciated. M.D., Ohio.

ANSWER.—The essential problem in this case is the differential diagnosis of urinary frequency. It is desirable to exclude organic disease before concluding that the symptoms are of functional nature. The normal urinary output would tend to exclude diabetes insipidus; high specific gravity of the urine would be further evidence against diabetes insipidus. The absence of glycosuria would exclude diabetes mellitus as the cause of the urinary frequency.

Atypical interstitial cystitis may manifest itself as simple urinary frequency, without pain and with asymptomatic periods. It is frequently difficult to make a diagnosis of interstitial cystitis, and competent specialists will admit that they have overlooked such cases. The negative urinalysis would be in keeping with such a diagnosis. All other forms of cystitis are usually accompanied by the presence of pathologic elements in the urine. Nonspecific chronic urethritis may produce simple urinary frequency.

It would seem advisable to consider that this patient has interstitial cystitis and the following treatment may be considered: solutions of silver nitrate, of increasing strengths, instilled into the bladder daily. The initial concentration should be 1:3,000 and the concentration increased to 1:100 during the following two weeks. The solution should be instilled into the bladder through a catheter, permitted to remain in place for five minutes and then drained off with the catheter. When higher concentrations are employed it may be necessary to prescribe opiates to relieve the temporary pain.

If urinary frequency persists, attention should then be directed toward the urethra. Tampons of strong protein silver solution (5 per cent) inserted into the urethra will frequently be efficacious. Dilation of the urethra to 24 French with massage of the urethra about the sound may help.

If symptoms persist in spite of these treatments it will be necessary to repeat the urologic investigation; both excretory urography and cystoscopy should be carried out. It is impossible to surmise what the urologist intended to convey by the expression "black spot."

If the urologic investigation reveals no abnormalities, the urinary frequency must be considered as functional in nature and treated by means of rest, recreation, suitable hobbies and mild sedation.

INHERITANCE OF BLOOD GROUPS

To the Editor:—Does a child always have the same type blood as its parents? For instance, if the father was IV and the mother IV, would the child be anything except type IV? Joseph Halton, M.D., Sarasota, Fla.

ANSWER.—The child does not always have the same blood group as its parents. The laws of inheritance are that: 1. The agglutinogens A or B cannot appear in the blood of a child unless present in the blood of one or both parents. 2. The combinations group AB parent with group O child, and group O parent with group AB child are not possible, regardless of what group the other parent belongs to. For example, in families where the two parents belong to group O and group AB respectively, half the children will belong to group A and half to group B, so that none of the children will have the group of either parent. Incidentally, if one designates the groups by numbers, as the inquirer does, one would have I by IV, giving

II and III. This confusing result is one reason why the designations of the groups by numbers should never be used; besides, two methods of designating groups by numbers exist. The inquirer does not state which designation he uses. Finally, it should be pointed out that in cases of disputed parentage tests should be made not only for the blood groups but also for the M-N types, in order to get the maximum information. For further details the books by Wiener (Blood Groups and Blood Transfusion, Springfield, Ill., Charles C. Thomas, 1939) and Schiff and Boyd (Blood Grouping Technic, Interscience Press, 1942), should be consulted.

EXCESSIVE SOMNOLENCE AND ENURESIS IN ADULT MAN—RESISTANT VAGINITIS IN YOUNG GIRL

To the Editor:—**A white man aged 32 has been suffering from enuresis since childhood. For the past twelve years he has not missed a single night wetting the bed. One hour after falling asleep the first bed wetting occurs, and this may be repeated two or three times during the night. His sleep is profound; no alarm clock is powerful enough to awaken him in the morning. His wife must throw him off the bed and slap him to get him up each morning. He is 5 feet 11 inches (180 cm.) in height and weighs 200 pounds (91 Kg.). His blood pressure is 120 systolic and 80 diastolic. The heart and lungs are essentially normal. The serologic reaction is negative and the urinalysis is normal. The reflexes are normal. Cystoscopic examination is negative, although several cauterizations of the verumontanum were done. The prostate is normal. Roentgenograms of the kidneys and ureters are negative. All sorts of medications, including atropine derivatives have been given to no avail. He smokes two packs of cigarets a day and cannot break the habit. Have you any suggestions as to the diagnosis and treatment? During the day he feels just as normal as any one else. Is the profound somnolence at night a factor in the enuresis? What measures can be taken to control it? Is there any drug that can lighten his sleep so that he will be able to arise easily in the morning? He has a daughter aged 8 who is suffering from a stubborn vaginitis, nonspecific in nature, which is also resistant to treatment. The sulfonamides and vaginal irrigations are of no avail. What is a good therapeutic regimen for the cure of this nonspecific vaginitis when sulfonamides and mild protein silver and mercurochrome solution irrigations are of no avail? Will the estrogens help?**

M.D., New York.

ANSWER.—It is possible that the profound somnolence which the patient has at night may be a factor in his enuresis. There is no drug available that will lighten his sleep. Since the patient has had a complete urologic work-up and nothing could be found to explain the enuresis, it would seem advisable for him to be examined by a neurologist. From the history and findings submitted it would be extremely hazardous to venture a diagnosis.

With regard to the patient's 8 year old daughter who is suffering from a stubborn vaginitis an examination of the vagina should be made, if it has not already been done, with a small speculum to rule out the possibility of a foreign body. In many little girls with nonspecific vaginitis there is a tendency to overtreatment, which keeps the irritation active. Sometimes when treatment is discontinued the condition clears up. It is not stated whether the sulfonamides were given by mouth or a solution or an ointment used. If a solution has not been used, the vagina could be irrigated twice a week with one-half ounce of 5 per cent sulfathiazole solution.

POSSIBLE PITYRIASIS LICHENOIDES

To the Editor:—**For about two years a man aged 28 has had great numbers of dark red macules and papules the size of sweet pea seeds, which are more numerous on the chest, abdomen and back but are distributed to all areas excepting the face, hands and feet. They are not tender, are slightly itchy and appear more numerous following a hot bath and rub, while a few may be blanched with pressure. He is a motor mechanic, athletic in type, and has had no illness excepting appendicitis, which was relieved by surgery. The only other complaint at present is aspermia with sterility. Repeated blood Wassermann tests have been negative and the blood calcium is normal. He has had large quantities of vitamins, a series of treatments of iron and arsenic intramuscularly and a prolonged course of bismuth subsalicylate, but the results have been nil. Please give an opinion on diagnosis and treatment.**

Ewart S. Sarvis, M.D., Sumas, Wash.

ANSWER.—From the meager description given, the possibility of the condition being pityriasis lichenoides chronica must be considered. This condition belongs to the parapsoriasis group and consists of a generalized eruption simulating psoriasis. To aid in diagnosis a biopsy is suggested, and the material should be submitted for study to a competent histopathologist. Treatment, as a rule, is not satisfactory in the chronic forms of parapsoriasis and consists in tonic measures together with generalized ultraviolet ray exposures. The possibility that pityriasis lichenoides chronica may presage the premycotic stage of granuloma fungoides (lymphoblastoma) must be considered, and the study of new cutaneous lesions that appear together with blood studies are of value in determining this.

OBESITY AND PROBABLE MIXED GLANDULAR DEFICIENCY IN YOUNG GIRL

To the Editor:—**I would appreciate having some advice on the treatment of a girl aged 16 who weighs 195 pounds (88.5 Kg.), is about 5 feet 1 inch (155 cm.) in height and shows obesity much like the adiposity of her mother. She has a mild headache, some disturbance of vision with myopia and astigmatism and the menses are irregular, having started when she was 11 years of age and since then she has had only six weak periods. She has a strong craving for salt. She was good at school until this year, when she slipped slightly in her studies. Her fat is distributed all over the body except that her legs and forearms are not fat as compared with the rest of the body. Her breasts are large and heavy and appear to drop a good deal. The urine shows a trace of sugar, but her blood sugar is 126 mg. per hundred cubic centimeters. Her blood picture is normal, and the basal metabolism is a minus 32.**

M.D., Oregon.

ANSWER.—The history suggests the diagnosis of hypopituitarism with secondary hypothyroidism and secondary hypogonadism.

In order to be certain that hypothyroidism is not the only abnormality involved, it would be well to raise the metabolism to normal with desiccated thyroid at the same time that a suitable weight reducing diet is given. If the menstrual irregularity does not clear up with this therapy, the effect of equine gonadotropin may be tried in a dose of 400 international units given daily for ten days after cessation of menstruation. This should be repeated after each succeeding menstrual period. If this therapy fails to correct the menstrual irregularity, substitution therapy with estrogenic substance may be tried for a period of two months, giving 10,000 rat units of alpha-estradiol benzoate once a week except during the time of the menstrual period.

In view of the headache, it would be well to rule out a pituitary tumor with a roentgenogram of the sella turcica.

EFFECT OF SINGLE LARGE ALCOHOL INTAKE ON FETUS

To the Editor:—**A patient is worried about the effects of alcohol when taken early during pregnancy on the future child. Specifically, this woman drank about 36 ounces of beer shortly after conception and before she knew she was pregnant. What is the present opinion in this respect as to imbibing that amount of alcohol on only one occasion early in pregnancy?**

M.D., New Jersey.

ANSWER.—The patient need have no worries about the effect of her beer debauch on her unborn baby. The amount of alcohol even in 36 ounces of beer is scarcely large enough to injure a fertilized ovum. In fact, in human beings it is difficult to prove that alcohol has a deleterious effect on babies in utero, even when large amounts are taken. Vignes (*Revue anthropologique* **51**:33 [April-June] 1941) maintains that acute alcoholism is a frequent cause of congenital defects, but whereas this is true among animals it has not been definitely proved for human beings. Likewise Vignes believes that acute alcoholism favors premature interruption of pregnancy.

PROBABLE SUBUNGUAL GLOMUS TUMOR

To the Editor:—**A patient has a small, faintly pigmented area underneath a fingernail which produces exquisite pain on pressure. My diagnosis is "subungual pigmented neuroma," for which I have advised excision of the nail and destruction of the lesion with the cautery. Is this correct procedure?**

M.D., Indiana.

ANSWER.—The scanty information supplied suggests that the subungual lesion may be a glomus tumor. A favorite site for a glomus tumor is beneath the fingernail. These tumors are small, match head size or larger lesions, soft or firm, bluish red and very painful. In some cases the pain is agonizing and radiates from the finger toward the shoulder. Pain is increased by a change in temperature, particularly cold. These tumors do not metastasize and seldom recur. Treatment consists in surgical excision.

TYPHOID VACCINATION IN THE UNITED STATES ARMY

In reply to an inquiry published in Queries and Minor Notes, June 27, 1942, page 763, under the heading "Intradermal Injections of Diphtheria and Typhoid Vaccines," it was stated that the United States Army gives one injection of 0.1 cc. of typhoid vaccine intradermally in routine reimmunizations. This method of reimmunization has received careful study at the Army Medical School, Washington, D. C. For various reasons it has not been officially adopted for routine use in the Army. Routine reimmunizations are now accomplished by three subcutaneous doses of triple typhoid vaccine.